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This report summarizes the results of the initial work on channel characterization for the Advanced Range Telemetry (ARTM) program. Data collected from channel sounding flights was used to determine the number, complex gain, and delays of multipath propagation paths that distort the received signal in common aeronautical telemetry scenarios. These parameters were estimated using frequency domain curve fitting techniques to describe significant number of multipath fade events recorded during channel sounding flights. The results were compared with time-domain cross correlation estimation techniques where applicable and found to be consistent. The physical geometry of the multipath environment was also analyzed where it was shown that that the multipath delays derived from the data analysis were consistent with those that could have been produced by the transmitter/receiver geometry. Both static channel models and dynamic channel models were evaluated. The static channel model consists of three propagation paths: a line-of-sight path; a strong specular reflection with an amplitude greater than 50% that of the line-of-sight path and delay 30 to 70 nanoseconds; and a weaker specular reflection with an amplitude less than 50% that of the line-of-sight path and a delay 175 to 325 nanoseconds. The dynamic channel model depends on the scattering function and Doppler spectrum. These functions were estimated from the data where it was found that the spatial sampling rate on the channel sounding flights to date was not sufficiently fast to capture the frequency content associated with the changes in the channel impulse response. The resulting Doppler spectra were obviously aliased.

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TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

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Both static channel models and dynamic channel models were evaluated. The static channel model consists of three propagation paths: a line-of-sight path; a strong specular reflection with an amplitude greater than 50% that of the line-of-sight path and delay 30 to 70 nanoseconds; and a weaker specular reflection with an amplitude less than 50% that of the line-of-sight path and a delay 175 to 325 nanoseconds.

The dynamic channel model depends on the scattering function and Doppler spectrum. These functions were estimated from the data where it was found that the spatial sampling rate on the channel sounding flights to date was not sufficiently fast to capture the frequency content associated with the changes in the channel impulse response. The resulting Doppler spectra were obviously aliased.

One thesis and two conference papers resulted from this work. The references are

[1] David Landon, *An Analysis of Dynamic Behavior of the Aeronautical Telemetry Channel.* Thesis, Brigham Young University, 1999.

[2] David Landon and Michael Rice, "Doppler Bandwidth Characterization of ARTM Channel Sounding Data," in *Proceedings of the International Telemetering Conference*, Las Vegas, Nevada, October, 1999.

[3] Michael Rice, David de Gaston, Adam Davis, Gus German, Christian Bettwieser, "ARTM Channel Sounding Results – An Investigation of Frequency Selective Fading on Aeronautical Telemetry Channels," in *Proceedings of the International Telemetering Conference*, Las Vegas, Nevada, October, 1999.

2 BACKGROUND

Current trends in telemetering applications make the ability to realize reliable data transfer problematic. First, bandwidth restrictions severely limit the amount of bandwidth available for these applications. Recent FCC auctions of bandwidth eliminate the possibility of increased bandwidth. Second, new systems with increased complexity have increased telemetry requirements which translates directly to high data rates on the wireless link. For fixed power systems, this translates to reduced E_b/N_0 ratios. Third, these new systems often have larger ranging capabilities. Larger transmitter to receiver separations coupled with fixed power transmitters reduce the received power levels which, in turn, further reduce the available E_b/N_0. These factors, increased bandwidth restrictions, higher data rates, and larger distances all combine in the worst possible way to limit the performance of modern telemetering systems.

The Advanced Range Telemetry (ARTM) Program is funded to address this problem by identifying new technology to which allows increased data rates and transmit-receiver separations while maintaining current bandwidth allocations and data reliability. Bandwidth efficient modulation and data compression are key elements in reducing the bandwidth requirements for high data rate applications. Error control coding and equalization are necessary to ensure data quality. While the performance of these methods in the AWGN and flat fading environments are well understood, there is limited information regarding their performance in typical telemetry environments. This report summarizes the efforts to measure and model the multipath interference effects on the aeronautical telemetry channel.

3 CHANNEL MODEL

For most wireless applications, the transmitted waveform arrives at the receiver via many reflected paths. An amplitude, phase, and time delay characterize each reflection. These values are a function of the number of reflectors and locations of the reflectors relative to the transmitter and receiver locations. In aeronautical telemetry, the receiver location is a fixed ground site while the transmitter is moving on an airborne platform. Thus the locations of the reflectors relative to the transmitter are changing with time. The consequence is time varying multipath interference. This time variation is modeled using a time-varying channel impulse response $\widetilde{h}(\tau;t)$ which measures the complex channel attenuation at delay τ and at time instant t. If $x(t)$ is the channel input, then the channel output $y(t)$ is related to the channel input by

$$y(t) = \int_{-\infty}^{t} h(\tau;t)x(t-\tau)d\tau \tag{1}$$

Using the complex baseband notation and assuming L propagation paths, the time varying channel impulse response is

$$\widetilde{h}(\tau;t) = \sum_{i=0}^{L-1} a_i(t)e^{j\phi_i(t)}\delta\left(\tau - d_i(t)\right) \tag{2}$$

where $a_i(t)$ is the time-varying amplitude of the i-th propagation path, $\phi_i(t)$ is the time-varying phase of the i-th propagation path and $d_i(t)$ is the time-varying delay of the i-th propagation path. In aeronautical telemetry systems, there is a strong line-of-sight propagation path which is assigned path number 0. For the purposes of the analysis, it is assumed that the amplitude and phase of the line-of-sight path are known and adequately tracked by the receiver (i.e. $a_0(t)$ and $\phi_0(t)$ are known). In this case the received signal may be expressed as

$$y(t) = \underbrace{a_0(t)e^{j\phi_0(t)}x(t-d_0(t))}_{\text{desired signal}} + \underbrace{\sum_{i=1}^{L-1} a_i(t)e^{j\phi_i(t)}x(t-d_i(t))}_{\text{additive ISI terms}} \tag{3}$$

where the effect of the multipath interference is obvious[1].

The severity of this interference is dependent on the power and delays relative to the line-of-sight term. This being the case, the channel impulse response is often normalized to the line-of-sight propagation path by dividing each complex attenuation by the known line-of-sight propagation and delay-shifting all paths by the line-of-sight delay. The result is a normalized channel impulse response $h(\tau;t)$ given by

$$\begin{aligned} h(\tau;t) &= \frac{\tilde{h}(\tau + d_0(t))}{a_0(t)e^{j\phi_0(t)}} \\ &= \delta(\tau) + \sum_{i=1}^{L-1} \frac{a_i(t)}{a_0(t)} e^{j(\phi_i(t)-\phi_0(t))} \delta(\tau - [d_i(t) - d_0(t)]) \\ &= \delta(\tau) + \sum_{i=1}^{L-1} \Gamma_i(t) e^{j\theta_i(t)} \delta(\tau - \tau_i(t)) \end{aligned} \tag{4}$$

where $\Gamma_i(t)$ and $\theta_i(t)$ are now the relative path gains and phases and $\tau_i(t)$ is the delay relative the line of sight delay.

In the experimental results section it is demonstrated that three ($L = 3$) propagation paths is adequate to model the multipath interference observed during the test flights conducted to date. The channel is well modeled by a line-of-sight path, a strong specular reflection with a delay of approximately 30 to 70 ns range; and a weaker, long delay specular reflection delay in the 175 to 325 ns range.

The impulse response of a real channel varies with time giving rise to a linear time-varying system model for the channel. The variations are dependent on the transmitter trajectory and the

[1] When the multipath delays $d_i(t)$ for $i = 1,2,\ldots,L$-1 are on the order of a symbol time or longer, the multipath interference manifests itself as an additive ISI interference as shown. On the other hand, when the multipath delays are a small fraction of the symbol time, the multipath interference manifests itself as multiplicative distortion and is modeled by using a random channel attenuation factor. This is commonly known as flat fading since all frequencies in the signal bandwidth are equally attenuated. The aeronautical telemetry channel is known to be frequency selective, so the additive ISI notation is used in this development.

velocity of the transmitter and vary in a seemingly random way. Random channel variations are modeled using statistical correlation functions. The dynamic behavior can be summarized by a computing the appropriate Fourier transform which displays the frequency content of the channel dynamics. Let $h(\tau,t)$ be the channel impulse response at delay τ and time instant t. The channel delay correlation function is defined as

$$R_{hh}(\tau,t) = E\{h(\lambda,t)h^*(\lambda+\tau,t)\} \tag{5}$$

where $E\{\cdot\}$ is the statistical expectation operator. The spaced-time channel correlation function is computed by performing an additional correlation along the time axis:

$$R_{hh}(\tau,\Delta t) = E\{h(\lambda,t)h^*(\lambda+\tau,t+\Delta t) \tag{6}$$

The scattering function is derived from the spaced-time channel correlation function by computing the Fourier transform with respect to the spaced-time axis Δt:

$$S_c(\tau,\nu) = \mathfrak{I}\{R_{hh}(\tau,\Delta t)\}. \tag{7}$$

The scattering function indicates the power as a function of delay and Doppler spread. Often, system designers are only interested in the Doppler spread since that indicates the bandwidth required by adaptive tracking loops to keep up with changes in the channel impulse response. The Doppler spectrum $S_c(\nu)$ is computed from the scattering function by integrating along the delay axis (τ):

$$S_c(\nu) = \int_{-\infty}^{\infty} S_c(\tau,\nu)d\tau \tag{8}$$

The range of frequencies over which the Doppler spectrum is non-zero is called the Doppler bandwidth of the channel and is denoted B_d. The reciprocal of the Doppler bandwidth is approximately the support (in time) of the autocorrelation function and is called the coherence time of the channel and is denoted $(\Delta t)_c$.

4 CHANNEL SOUNDING TECHNIQUES

The first decision was to choose wideband channel sounding over narrowband channel sounding. Narrowband channel sounding uses a narrowband signal (such as a pilot tone at the carrier frequency) to probe the channel. When a pilot-tone is used as the channel input,

$$x_{\mathrm{BP}}(t) = e^{j\omega_0 t} \tag{9}$$

so that the equivalent complex baseband signal is

$$x(t) = 1. \tag{10}$$

The resulting channel output, $y(t)$, is given by

$$y(t) = \int_{-\infty}^{t} h(\tau;t)d\tau \qquad (11)$$

and provides channel attenuation and bulk phase shift information. Since the desired details about the channel impulse response cannot be extracted from this data, wideband channel sounding was chosen.

Wideband channel sounding uses a wideband signal to probe the channel and obtain information on the channel impulse response. The goal is to produce a channel output $y(t)$ from which the channel impulse response $h(\tau;t)$ can be computed. Two options were considered:

1. Periodic Pulse Test: In this test, the transmitted signal is a periodic impulse train where the spacing between the impulses is far enough apart to allow the channel impulse response to decay but close enough together to provide an adequate spatial sampling rate. This option was rejected since impulses have an infinitely high amplitude, zero duration, and infinite bandwidth. Even if an amplifier existed which was capable of the large peak-to-average power ratio required by this technique, a transmitter of this sort would never be approved by range spectrum management.
2. Wideband Signal Test: In this test uses a wide-band signal with good cross-correlation properties is transmitted over the channel. The receiver records the received signal and cross correlates this signal with a copy of the wide-band signal emitted by the transmitter. The peaks in the cross correlation correspond to delayed reflections and provide an estimate of the channel correlation function. A popular choice for the wide-band signal is a BPSK signal modulated by a PN sequence based on an M-sequence. These signals offer low peak-to-average power ratios and have a bandwidth that can be controlled by selecting the appropriate PN chip rate.

The wideband signal test was selected for the since it has a desirable peak-to-average power ratio, reasonable bandwidth control, and can be used with a BPSK demodulator and bit error rate tester to provide BER data for the channel. (Bit error rate testers are based on PN sequences as well. The PN sequence selected for channel sounding was one of the PN sequences the bit error rate tester would synchronize to.)

There are two methods that can be used to extract the channel parameters from the received data when using a wideband channel sounding test time domain analysis and frequency domain analysis.

4.1 Time Domain Analysis

Time domain analysis exploits the correlation properties of the wideband PN sequence to estimate the multipath channel parameters. The basic technique is illustrated in Figure 1 where the channel output $y(t)$ is cross correlated with a local replica of the channel input $x(t)$. The

resulting peaks in the cross-correlation function indication the location and relative amplitude of multipath reflections.

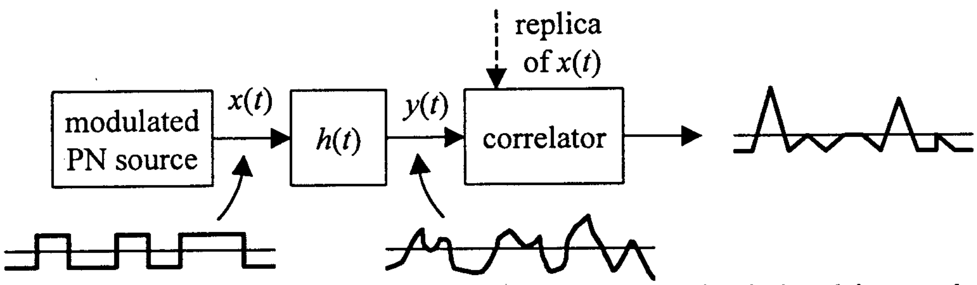

Figure 1: PN sequence method for channel sounding. The received signal is correlated with a locally generated replica of the transmitted modulated PN sequence. The resulting correlation peaks identify the multipath reflections.

Let the channel input, $x(t)$, be a bipolar NRZ pseudo-random (PN) sequence of length M. The PN sequence is used because it has the desirable correlation property

$$R_{XX}(\lambda) = \int_{-\infty}^{\infty} x(t+\lambda)x^*(t)dt = \begin{cases} 1 - \frac{|\lambda|}{T_c}\left(1 + \frac{1}{M}\right) & |\lambda| \leq T_c \\ -\frac{1}{M} & T_c < |\lambda| < (M-1)T_c \end{cases} \tag{12}$$

where T_c is the bit period. A plot of the correlation function (12) is shown in Figure 2 where it is seen that it is periodic with period T_c.

To see how channel sounding is accomplished using a signal with this property, consider what happens when x(t) is passed through a two ray channel with impulse response given by Equation (4) for L = 2. In this case, $y(t) = x(t) + \Gamma e^{j\gamma} x(t-\tau)$. The channel sounding procedure computes the cross correlation between the received signal $y(t)$ and the transmitted PN sequence $x(t)$:

$$\begin{aligned} R_{YX}(\lambda) &= \int_{-\infty}^{\infty} y(t+\lambda)x^*(t)dt \\ &= R_{XX}(\lambda) + \Gamma e^{j\gamma} R_{XX}(\lambda - \tau) \end{aligned} \tag{13}$$

The cross correlation function is plotted in Figure 3 for two important cases. In the first case, $\tau > 2T_c$ so that the correlation peaks do not overlap. From the cross correlation function, we are able to determine the magnitude, phase, and delay of the reflection. In the second case, $\tau < 2T_c$ so that the two correlation peaks overlap thereby making the determination of the reflection properties problematic.

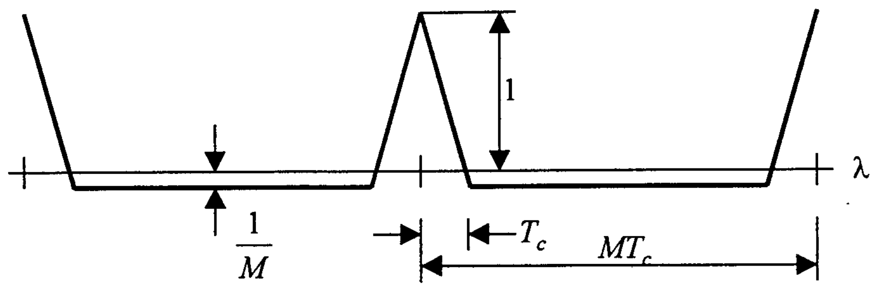

Figure 2: Periodic correlation function for length-M PN sequence modulated with bipolar NRZ pulse shape with a bit period of T_c seconds.

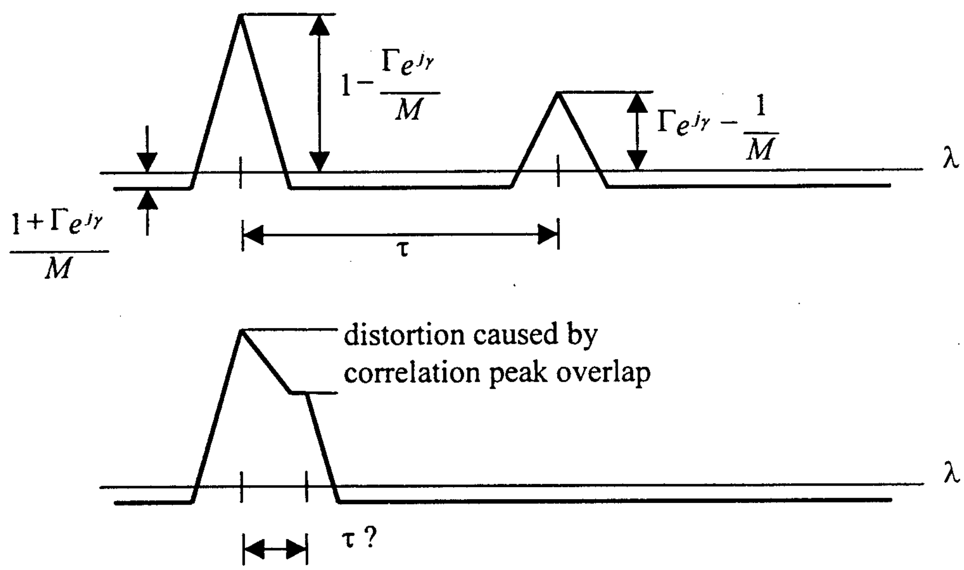

Figure 3: Examples of the cross correlation between the transmitted length-M PN sequence and the output of a 2-ray channel with impulse response given by Equation (4) with $L = 2$. The top figure illustrates the case where the delay τ is greater than $2T_c$. Two distinct peaks are obvious and are separated by the time delay τ. The bottom figure illustrates the case where τ is less than $2T_c$. The two correlation peaks are smeared together making the identification of the channel parameters problematic.

4.2 Frequency-Domain Analysis

When $\tau < 2T_c$ it is still possible to perform some channel modeling using frequency domain techniques. This technique uses the power spectral densities of the input and output signals which we denote by $S_X(f)$ and $S_Y(f)$, respectively, and exploits the relationship

$$S_Y(f) = |H(f)|^2 S_X(f). \tag{14}$$

Using this technique, the power spectral density of the received signal is computed then divided by the power spectral density of the known transmitted signal (the PN sequence in our case) to obtain an estimate of the magnitude of the channel transfer function (which we call $\left|\hat{H}(f)\right|$):

$$\left|\hat{H}(f)\right|^2 = \frac{S_Y(f)}{S_X(f)}. \tag{15}$$

5 EXPERIMENTAL CONFIGURATION

The channel sounding experiments were conducted as outlined in Figure 1. A length-127 PN sequence was transmitted using a 10 Mbit/second BPSK transmitter in a T-39 aircraft. A 2-Watt linear power amplifier was connected to a linearly polarized antenna mounted under the fuselage. A GPS receiver logged the time and position for post flight data correlation. The receiving station was located at Building 5790, the main telemetry receiving site at the Edwards AFB complex. The receiver was equipped with a circularly polarized tracking antenna, a wideband telemetry receiver with a linear 70 MHz IF output, and data acquisition equipment. The receiver AGC signal was sampled at a rate of 50 ksamples/second and recorded with GPS derived time stamps. The bit error counts from the bit error rate analyzer were also logged.

The IF output was sampled at a rate of 100 Msamples/second using a LeCroy high-speed digital oscilloscope. The oscilloscope sampling-trigger was driven by a BPSK demodulator coupled with a bit error rate analyzer. Whenever the bit error count exceeded a certain level, the sample trigger was asserted. During each trigger event, the digital oscilloscope recorded 10 evenly spaced data segments. Each segment consisted of 10,000 samples, or 100 microseconds of data. At the end of each trigger event, the samples were downloaded from the digital oscilloscope to a PC and logged with a time stamp.

The ARTM channel sounding flights are conducted as summarized in Table 1 below:

Table 1: ARTM Channel Sounding Flight Summaries

ARTM Flight Identifier	Date	Location
Flight 06	29 September 1998	Edwards AFB
Flight 07	1 October 1998	Edwards AFB
Flight 10	10 December 1998	Edwards AFB
Flight 11	16 February 1999	Edwards AFB
Flight 12	22 February 1999	Edwards AFB
Flight 13	1 April 1999	Pt. Mugu NAWC
Flight 14	1 April 1999	Pt. Mugu NAWC
Flight 18	28 July 1999	Edwards AFB

The Flights covered by the scope of the AFOSR contract are ARTM Flights 10 and 11. The particular details of the channel sounding parameters for these two flights are summarized in Table 2.

Table 2: Technical specification summaries for ARTM Flights 10 and 11.

ARTM flight identifier	Flight 10	Flight 11
carrier frequency	1510.5 MHz	2344.5 MHz
receive antenna	8-foot parabolic reflector	12-foot parabolic reflector
segment spacing	200 msec	150 msec
flight path	Black Mountain	Cords Road

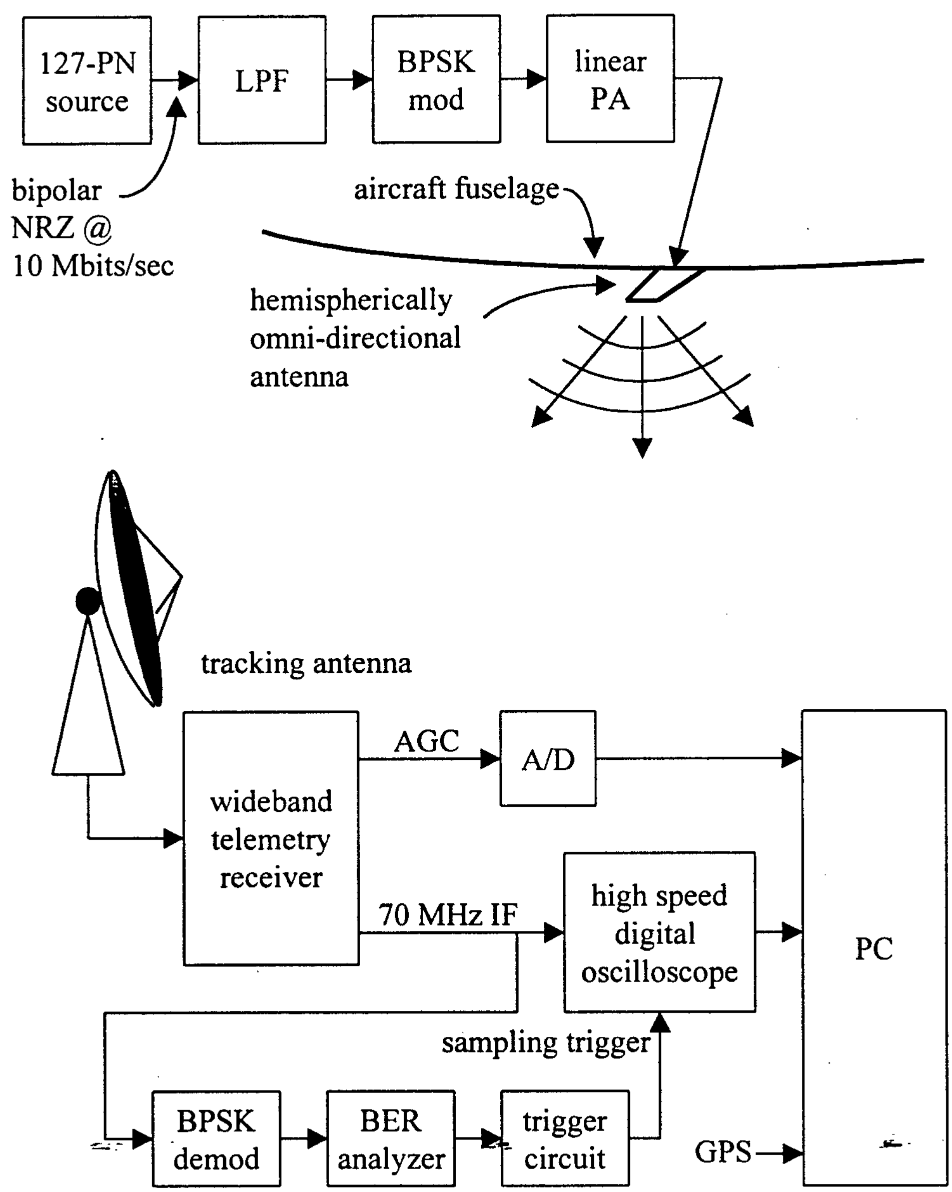

Figure 4: System configuration for the ARTM channel sounding flights.

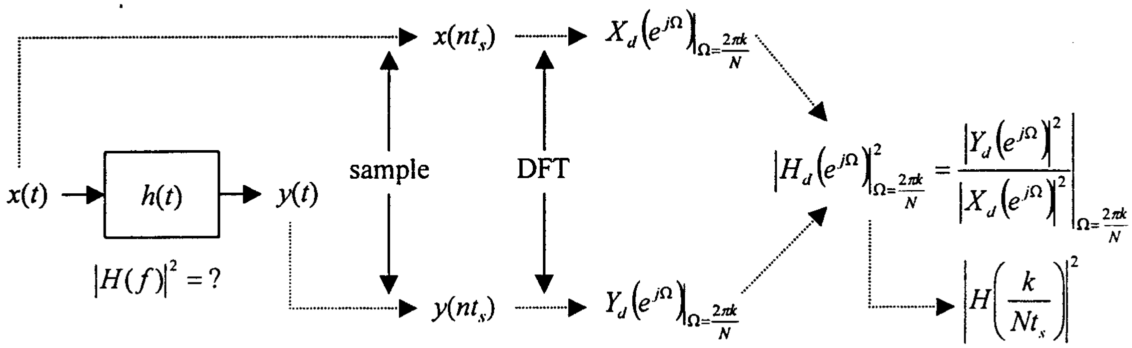

Figure 5: Diagram illustrating the relationship between discrete-time processing and the continuous-time channel impulse response.

6 DATA ANALYSIS

To apply the frequency domain curve fitting techniques of Equations (9) and (10) to the sampled data, careful associations must be made between the recorded discrete-time data and the continuous-time data assumed by the technique. This association is outlined in Figure 2. Let $y(t)$ be the linear IF signal and let $y(nt_s)$ be the samples of the IF signal where $t_s = 10$ ns is the sample period. Computing the N-point DFT of the sequence $y(nt_s)$ produces $Y_d\left(e^{j\Omega}\right)\Big|_{\Omega=\frac{2\pi k}{N}}$ for $k = 0,1,\ldots,N-1$ where $Y_d\left(e^{j\Omega}\right)$ is the discrete-time Fourier transform (DTFT) of $y(nt_s)$ and $-\pi < \Omega \leq \pi$ is the discrete-time frequency. Let $x(nt_s)$ be samples of the IF version of the transmitted signal $x(t)$ and let $X_d\left(e^{j\Omega}\right)$ be the N-point DFT of $x(t)$. The ratio

$$\left|H_d\left(e^{j\Omega}\right)\right|^2_{\Omega=\frac{2\pi k}{N}} = \left.\frac{\left|Y_d\left(e^{j\Omega}\right)\right|^2}{\left|X_d\left(e^{j\Omega}\right)\right|^2}\right|_{\Omega=\frac{2\pi k}{N}} \qquad \text{for } k = 0,1,\ldots\text{N-1} \tag{16}$$

represents frequency domain samples of $\left|H(f)\right|^2$ over those frequencies where $X(f)$ has support [15]. That is

$$\left|H_d\left(e^{j\Omega}\right)\right|^2_{\Omega=\frac{2\pi k}{N}} = \begin{cases} \left|H\left(\dfrac{k}{Nt_s}\right)\right|^2 & k = 0,1,\ldots,N/2 \\ \left|H\left(\dfrac{k-N}{Nt_s}\right)\right|^2 & k = N/2+1,\ldots,N-1 \end{cases} \tag{17}$$

Thus while it is impossible to sample $h(t)$ given by (2), (4), or (5) directly (they are not bandlimited signals), it is possible to model samples of $H(f)$ over a limited frequency range [15]. Using the DFT's of the sampled input and output signals and Equation (12) in place of $\left|H(f)\right|^2$

in Equation (10), the frequency domain technique may be used to determine the least squares parameters for our channel model using the sampled data. For the three-ray model, these parameters $\Gamma_{1,ML}$, $\gamma_{1,ML}$, $\tau_{1,ML}$, $\Gamma_{2,ML}$, $\gamma_{2,ML}$, $\tau_{2,ML}$ are determined from

$$\begin{aligned} &\Gamma_{1,ML}, \gamma_{1,ML}, \tau_{1,ML}, \Gamma_{2,ML}, \gamma_{2,ML}, \tau_{2,ML} \\ &= \min_{\substack{\Gamma_1, \gamma_1, \tau_1 \\ \Gamma_2, \gamma_2, \tau_2}} \left\{ \left[10 \log_{10}\left(\left| 1 + \Gamma_1 e^{j\gamma_1} e^{-j\Omega\tau_1} + \Gamma_2 e^{j\gamma_2} e^{-j\Omega\tau_2} \right|^2 \right) - 10 \log_{10}\left(\left| H_d\left(e^{j\Omega}\right) \right|^2 \right) \right]^2 \right\} \end{aligned} \tag{18}$$

where $20 < \frac{\Omega}{2\pi t_s} \times 10^{-6} < 40$ is used to limit the scope of the curve fitting to the main lobe of the transmitted signal spectrum. (Note that the IF frequency at 70 MHz is aliased to 30 MHz when sampled at 100 Megasamples/second.)

7 EXPERIMENTAL RESULTS

Flights 10 and 11 provided information from different locations at different frequencies using different receive antennas. This data represents a coarse sampling of the multipath environments common to land-based aeronautical telemetry and gives us some idea of the number, strength, and delays of the multipath reflections to be expected. Some representative curve fits from Flight 10 are illustrated in Figures 7 and 8. These figures also illustrate the data modeling technique using the DFT's of the sampled transmitted and received signals. Figure 7 demonstrates an example where the 2-ray channel model is an excellent match to the data and suggests the existence of a strong specular reflection with a relative amplitude of 0.97 and a differential delay (from the line-of-sight path) of 47 ns. It is clear from the plot in the lower right hand corner that the added complexity of the 3-ray model is unnecessary in modeling this particular data segment. In this case the third ray has a relative amplitude of only 0.04 and could be ignored. Figure 8 is an example where the 3-ray model is required. These results suggest the presence of a strong multipath reflection delayed 74 ns from the line-of-sight signal and a weaker multipath reflection delayed 302 ns from the line-of-sight signal. Both of these examples illustrate an important relationship between the 2- and 3-ray models. The first reflection in the 3-ray model is usually the strong reflection associated with a short delay and is consistent with the reflection modeled by the 2-ray channel model. The second reflection of the 3-ray model is usually a weaker reflection with a long delay. The inclusion of this additional multipath reflection improves the accuracy of the model. Generalizing to L multipaths (see Equation (5)), it is evident that improved modeling accuracy can be realized at the expense of computational complexity. Our experience with these models and the available data suggest that a 3-ray model adequately captures all the essential features of the channel distortions caused by multipath propagation.

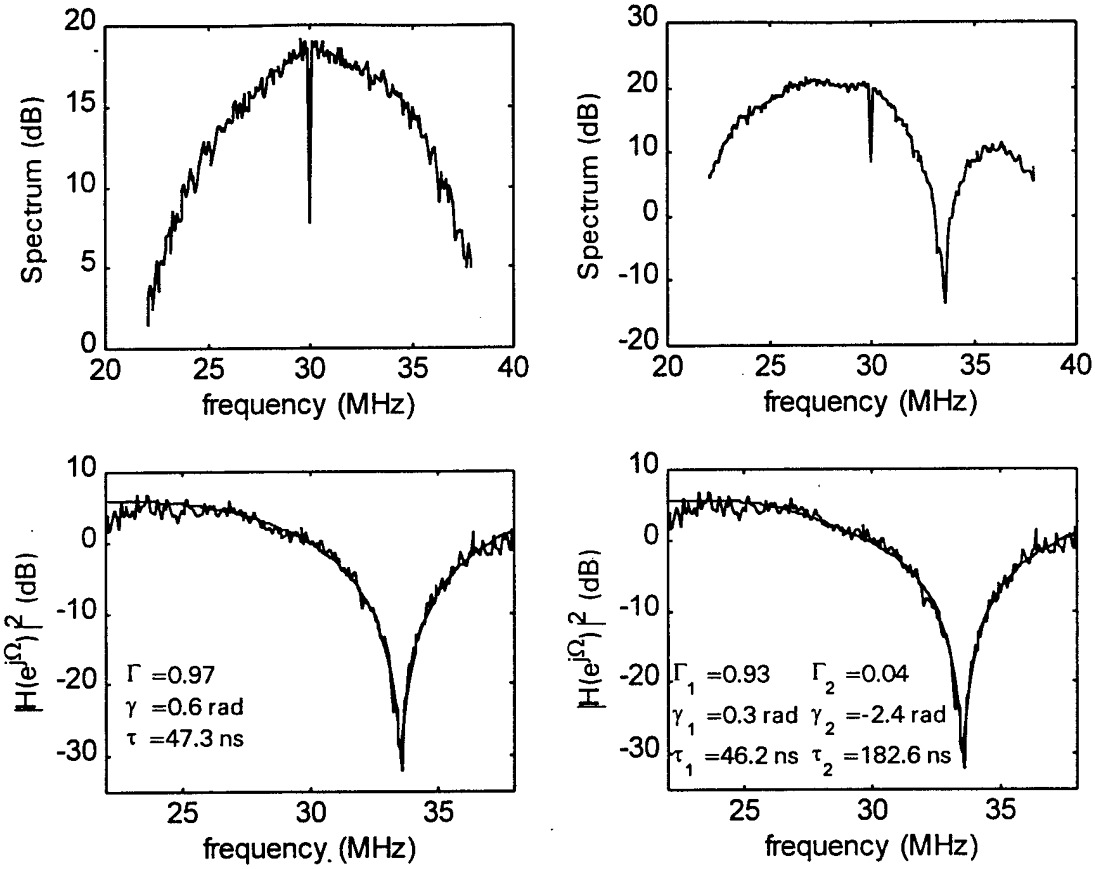

Figure 6: Representative data from Flight 10. This data was recorded during the first segment at time stamp 17:30:11. Starting in the upper left and moving clockwise: (1) the DFT of the transmitted signal; (2) the DFT of the received signal; (3) the resulting sampled channel transfer function together with the least squares curve fit for the 3-ray model; (4) the resulting sampled channel transfer function together with the least squares curve fit for the 2-ray model.

The data used in Figure 8 also illustrates an important caveat of channel characterization using the PN cross correlation method. The PN cross correlation for the data of Figure 8 is plotted in Figure 9. The PN cross-correlation data show three peaks at 0 ns (the line-of-sight path), 120 ns, and 370 ns. The 120 ns spacing between the first and second correlation peaks is well below the 200 ns spacing required by the PN correlation method to resolve the individual multipath reflections. The correlation peak at 120 ns is a false correlation peak resulting from the out-of-phase interference between the line-of-sight path and the multipath reflection delayed 74 ns. When the delay between the multipaths is greater than 200 ns, the PN cross correlation method does a nice job of identifying the delay. This is illustrated by the third correlation peak at 370 ns in Figure 9 and is consistent with the frequency domain modeling results in Figure 8.

Figure 10 illustrates sample results from Flight 1~~1~~. This plot is an example of ~~a~~ long multipath delay of 360 ns. As expected, a multipath characterized by a delay this long has a relative amplitude which is smaller than the relative amplitudes associated with short-delay multipath

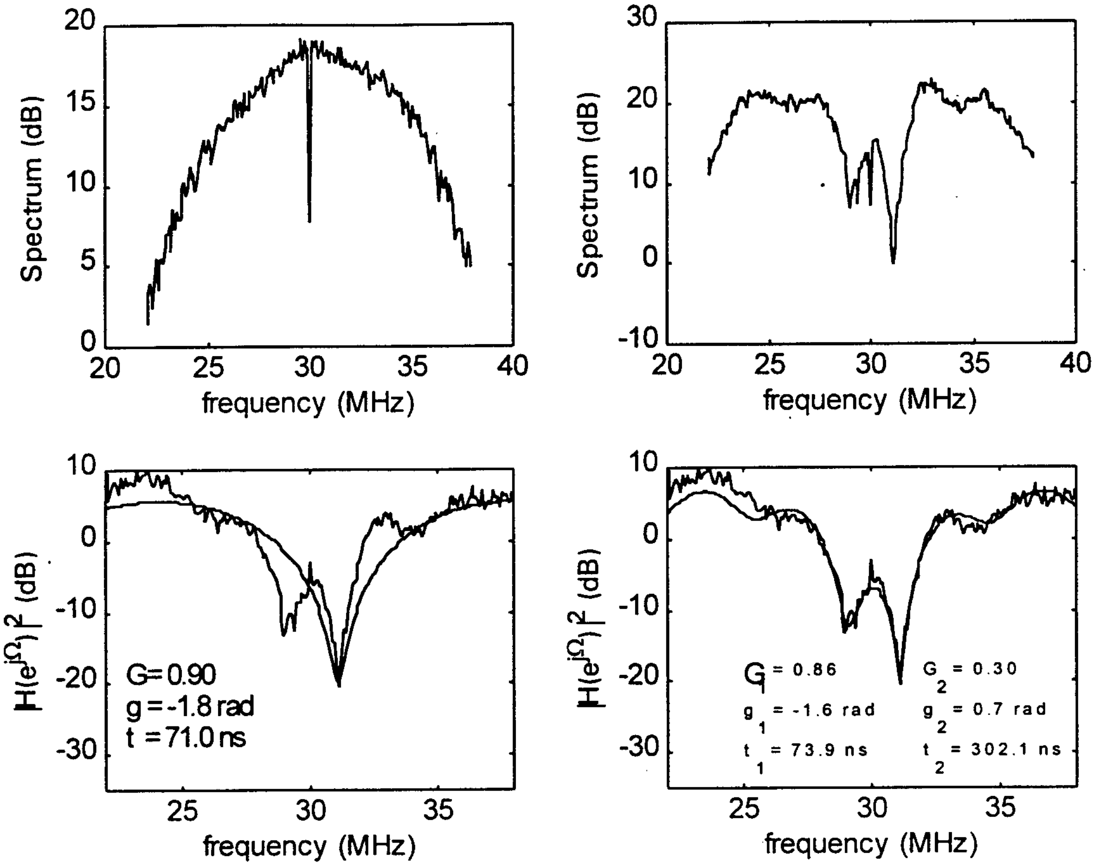

Figure 7: Representative data from Flight 10. This data was recorded during the ninth segment at time stamp 17:30:11. Starting in the upper left and moving clockwise: (1) the DFT of the transmitted signal; (2) the DFT of the received signal; (3) the resulting sampled channel transfer function together with the least squares curve fit for the 3-ray model; (4) the resulting sampled channel transfer function together with the least squares curve fit for the 2-ray model.

reflections. The frequency domain and PN cross-correlation methods produce very similar results. This reinforces our confidence in the modeling results obtained using the frequency domain technique.

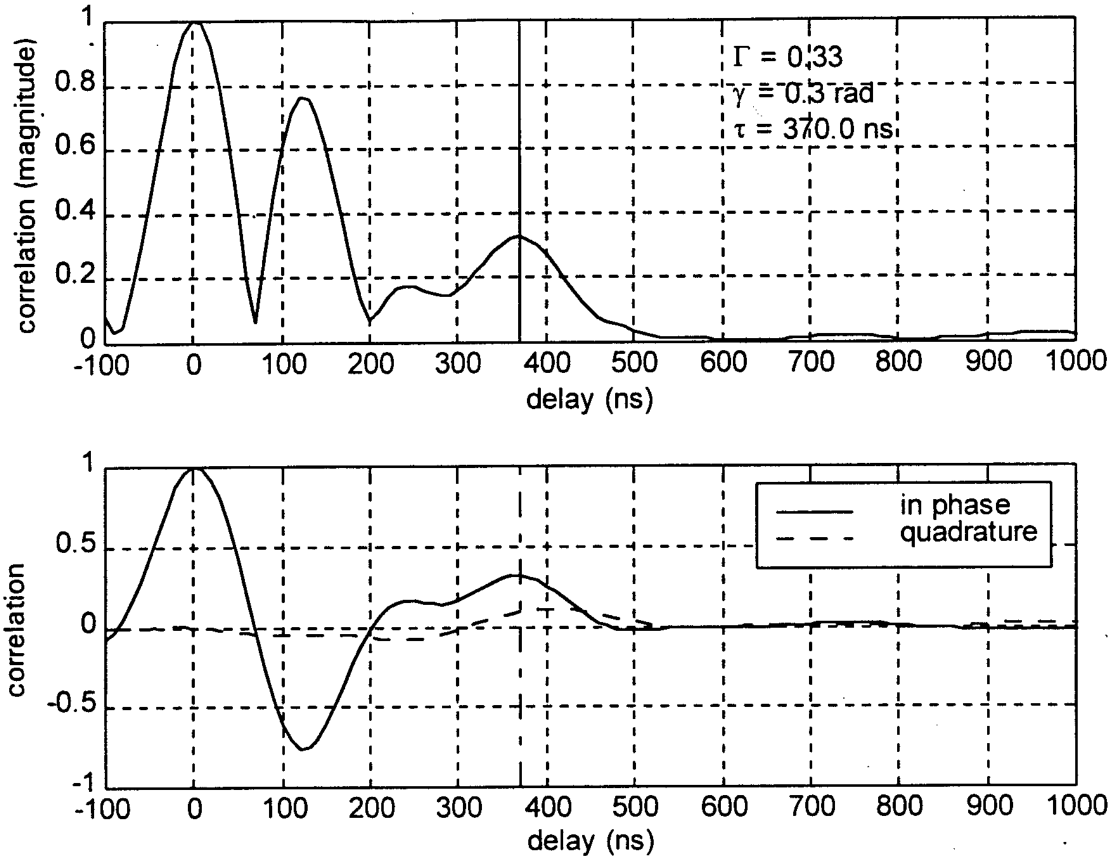

Figure 8: PN cross correlation results for the data presented in Figure 8. These plots are a good example of both the utility and danger of using the PN cross correlation method for the channel parameter estimation. The tallest peak at (normalized) delay 0 ns represents the line-of-sight signal. The frequency domain least-squares curve fits in Figure 8 show that there are two delays accompanying the line-of-sight path. The first delay is a strong delay with relative amplitude 0.86 and relative delay 74 ns. The relative delay is much shorter than the minimum 200 ns spacing required for delay estimation using the PN cross correlation method. In this example, the phase difference between the line-of-sight path and the short-delay path causes a false peak at 120 ns in the correlation. This false peak is obvious in the top plot. The frequency domain least squares curve fit in Figure 8 identifies a second delay with relative amplitude 0.3 and delay 302 ns. This delay is obvious in the correlation curve in the top figure where a peak with relative amplitude 0.33 at 370 ns is observed.

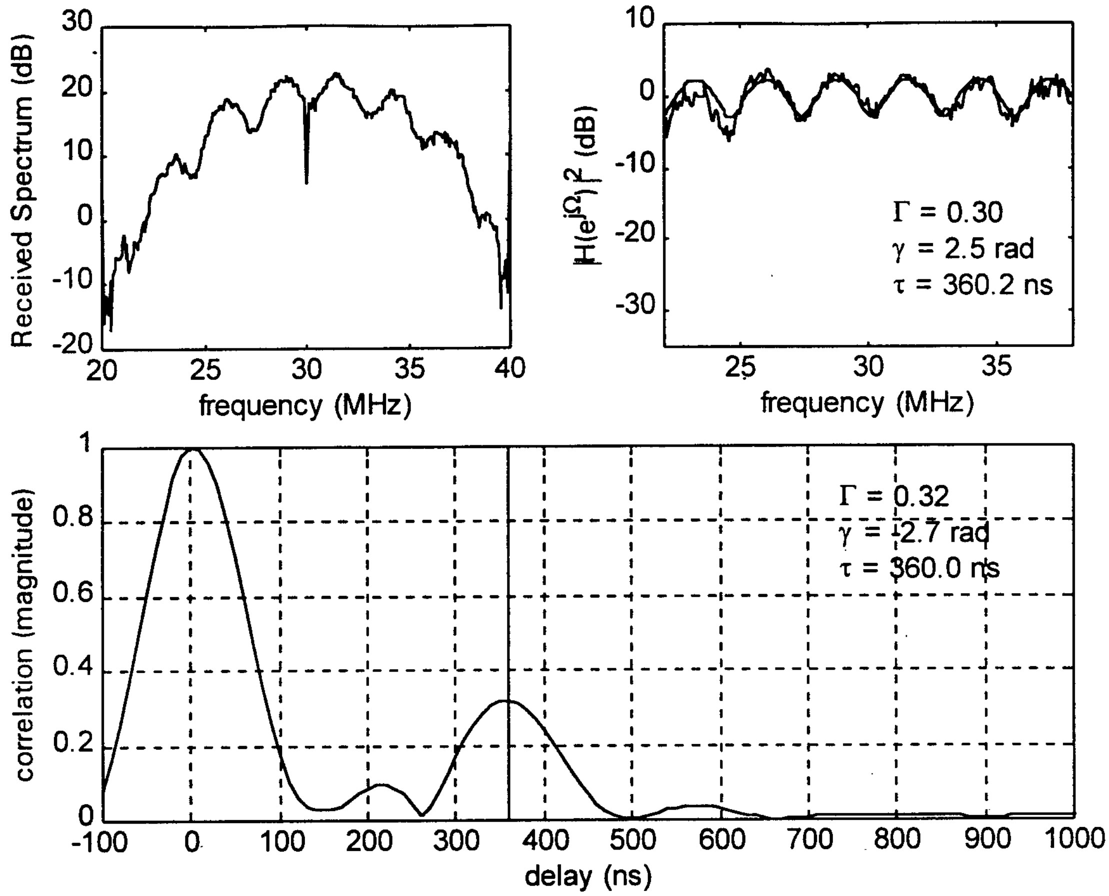

Figure 9: Sample data from Flight 11 showing an example of a long-delay multipath reflection. The upper left plot is the DFT of the received signal (the transmitted signal is identical to the one shown in Figures 7 and 8). The upper right is a plot of the measured transfer function together with a plot of the least squares fit using the 2-ray model. The bottom is a plot of the magnitude of the PN correlation function which shows a correlation peak at 360 ns. Note the close agreement between the frequency domain technique and the PN cross correlation method when the delay is well in excess of 200 ns.

Figure 10: Parameter summaries of the 2-ray model (left column) and 3-ray model (right column) for the Black Mountain Run (ARTM Flight 10) at Edwards AFB with an aircraft at an altitude of 5,000 feet.

Figures 11 through 14 summarize the 2- and 3-ray modeling results using the frequency-domain technique. Figures 11 and 12 summarize the results from Flight 10 at L-band while Figures 13 and 14 summarize the results from Flight 11 at S-band. We make the following observations:

7.1 General Form for the Static Multipath Model

In general, we observe two multipath reflections together with the line-of-sight signal. The first multipath is a strong specular reflection with relative amplitude greater than 0.5 and relative delay in the 30 to 70 ns range. The second multipath is a much weaker reflection with relative amplitude less than 0.5 and relative delay in the 175 to 325 ns range. To demonstrate that these numbers are reasonable, we consider the cross sectional slice of terrain for Flight 10 at time 17:30:11 (the high-altitude Black Mountain run) shown in Figure 15. The differential path delays for a single multipath reflection with reflection points A, B, and C as shown were computed. The differential delay assuming a reflection from point A (the edge of the 3-dB antenna beamwidth) is 28 ns. The differential delay assuming a reflection from point B is 231 ns while the differential

delay assuming a reflection from point C is 5855 ns. These values bound the possible delays of multipath reflections from

Figure 11: Parameter summaries for the 2-ray model (left column) and 3-ray model (right column) for the Black Mountain Run (ARTM Flight 10) at Edwards AFB with an aircraft at an altitude of 10,000 feet.

the ground at this point in the test flight. The modeling results summarized in Figure 8 are within this range . Note that for the data modeled in Figure 8, we see that the strong, short-delay reflection occurs off the dry lake bed approximately half way between the aircraft and the receiver while the weak, long-delay reflection occurs in the foothills of the Black Mountains.

Amplitude-Delay Relationship: In general, strong multipaths are characterized by short delays on the order of 50 ns. Multipath reflections with longer relative delays on the order of 200 to 300 ns are much weaker. This is to be expected since the longer paths that lead to longer delays usually impose greater attenuation.

Frequency Dependency: Given the limited data available at this time, it is difficult to determine which differences in Figures 11 through 14 are frequency dependent and which are geometry dependent. Figures 13 and 14 demonstrate that there is tremendous variation over a single flight path. Even though the frequencies and flight paths were different, the results from the curve

fitting at the two frequencies are quite similar. It is clear that there is significant multipath interference at both the L- and S-bands.

Figure 12: Parameter summaries for the 2-ray model (left column) and 3-ray model (right column) for the middle portion of the Cords Road Run (ARTM Flight 11) at Edwards AFB with an aircraft at an altitude of 4,200 feet.

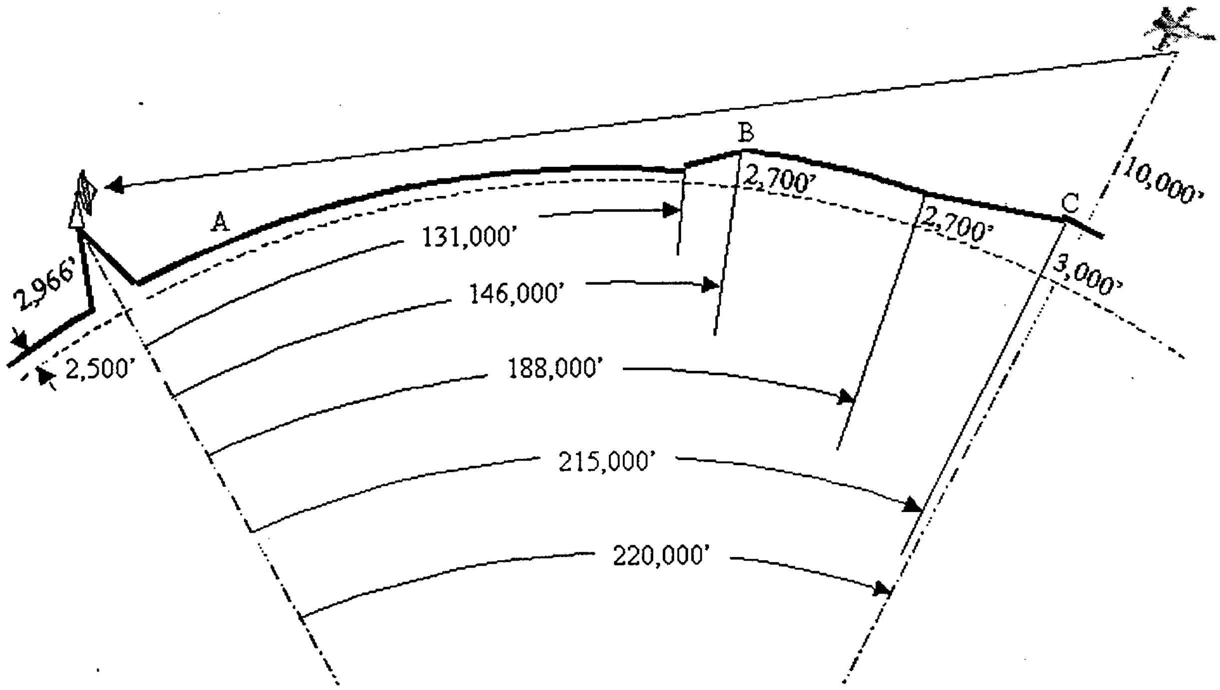

Figure 13: Cross-section of the aircraft-to-ground station terrain for Flight 10, time 17:30:11. The vertical scale is exaggerated to show the terrain features where the elevations are indicated. The line-of-sight path is shown as the solid line from the aircraft to the ground station. The differential delay for a single multipath reflection for 3 different reflection points is computed: point A, the edge of the 3-dB beam width; point B, the edge of the low hill overlooking the dry lake bed; point C, near the top of the Black Mountains directly under the aircraft. The differential delays are 28 ns for point A, 231 ns for point B, and 5855 ns for point C.

Clearly, the channel varies with time as the airborne transmitter moves through space. The dynamic behavior of the channel during the ten segments corresponding to time stamp 17:30:11 from ARTM Flight 10 is illustrated in Figure 14.

7.2 Dynamic Channel Model – Initial Results

The dynamic behavior of the channel is illustrated in Figure 11 where the sample channel transfer function for the 10 consecutive snapshots (i.e. segments) from ARTM Flight 10 are illustrated. These segments demonstrate how the channel parameters vary with time. At the beginning of timestamp 17:30:11, the channel transfer function is characterized by a deep multipath null just above the carrier frequency. As time progresses, this location of this null sweeps through the carrier frequency as it migrates down the frequency axis. The last four segments show that the null splits into two nulls which become deeper and more well defined as the flight progresses.

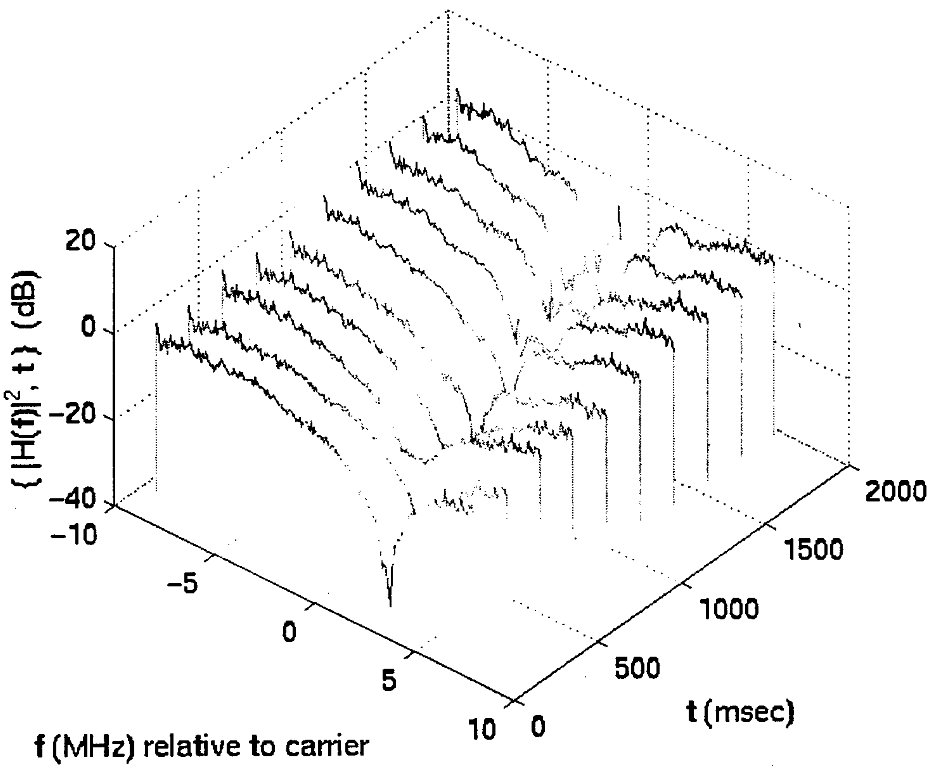

Figure 14: Sampled channel transfer functions for the 10 consecutive segments from ARTM Flight 10, timestamp 17:30:11.

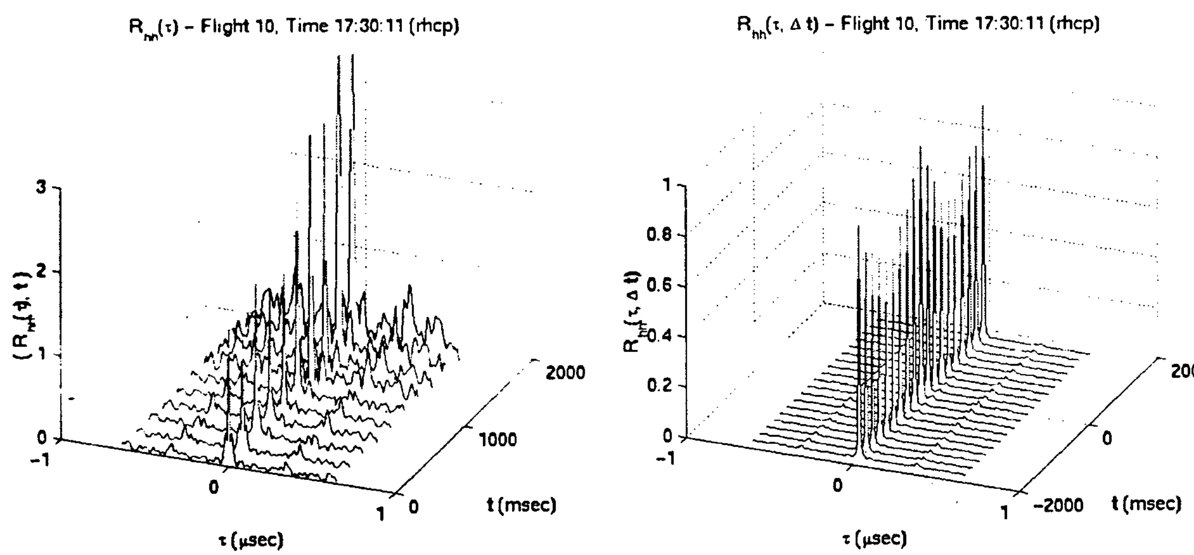

Figure 15: The delay channel correlation function (left) and the spaced-time channel correlation function (right) for the 10 segments from ARTM Flight 10 time stamp 17:30:11.

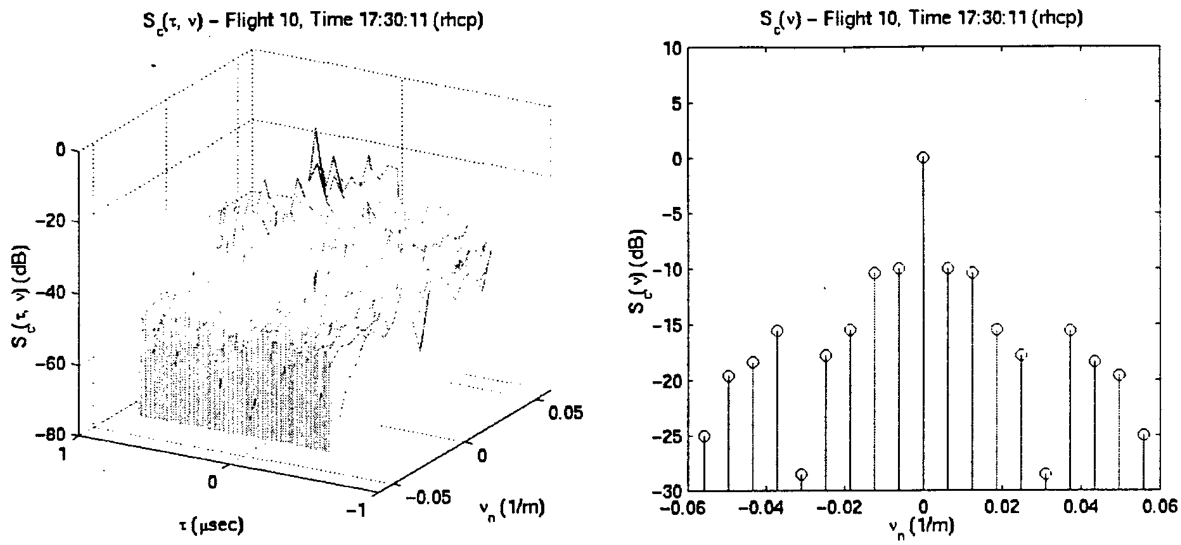

Figure 16: The scattering function (left) and the Doppler power spectrum (right) for the 10 segments from ARTM Flight10 time stamp 17:30:11.

The scattering function and Doppler power spectrum are used to describe this dynamic behavior. The first step is to compute the inverse Fourier transform along the delay (τ) axis as illustrated by the left hand side of Figure 12. This produces the delay channel correlation autocorrelation function $R_{hh}(\tau,t)$. Next, the correlation function along the time (t) axis is computed to produce the spaced-time channel correlation function $R_{hh}(\tau,\Delta t)$ as illustrated by the image on the right-hand side of Figure 12. The Fourier transform along the spaced-time axis is taken to produce the scattering function $S_c(\tau,\nu)$ illustrated by the left-hand plot of Figure 13. Integrating along the delay axis (τ) produces the Doppler power spectrum $S_c(\nu)$ illustrated by the right-hand plot of Figure 13. The frequency variable ν has units Hz (i.e. 1/s) and is dependent on the velocity of the transmitter. The dependency is removed by dividing ν by the transmitter velocity v to produce a normalized frequency variable ν_n that has units 1/m:

$$\nu_n = \frac{\nu}{v} \tag{19}$$

In this way, the actual bandwidth (in Hz) of the Doppler power spectrum can be computed for different transmitter velocities.

A summary of the channel dynamic analysis is illustrated in Figures 14 through 16. Figure 14 illustrates the Doppler spectrum for a channel characterized by slow changes as shown. The power spectrum has a narrow bandwidth, as expected. The situation is different in Figure 15. Here the channel is characterized by more rapid changes and the resulting Doppler power spectrum is not bandlimited. It appears that the underlying process was undersampled and that the resulting spectrum displays aliasing. The sampling rate in this case is the spatial sampling rate which is equal to the segment spacing and was 200 ms for Flight 10. An even worse case is illustrated in Figure 16 where a channel with rapid time variations is illustrated. The

corresponding Doppler spectrum is clearly aliased and shows that the segment spacing of 150 ms was not fast enough to adequately capture the frequency content of the channel dynamics. These cases demonstrate that a higher spatial sampling rate is required before good channel dynamic models can be derived.

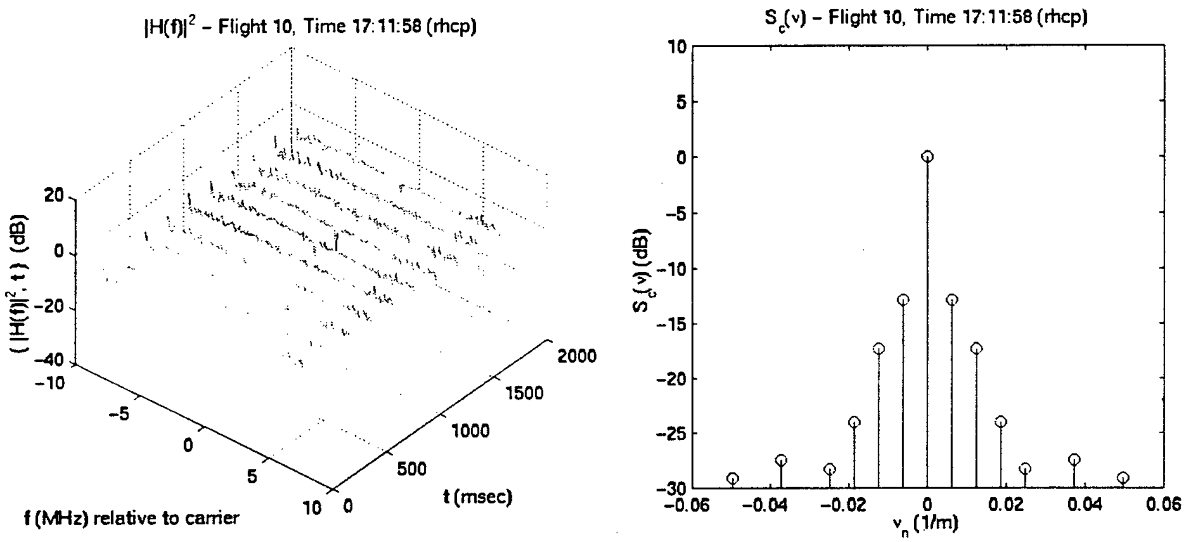

Figure 17: The sampled channel transfer function (left) and the corresponding Doppler spectrum (right) for the 10 segments of ARTM Flight 10, time stamp 17:11:58. This is an example of a channel with slow changes – note the narrow bandwidth of the Doppler power spectrum.

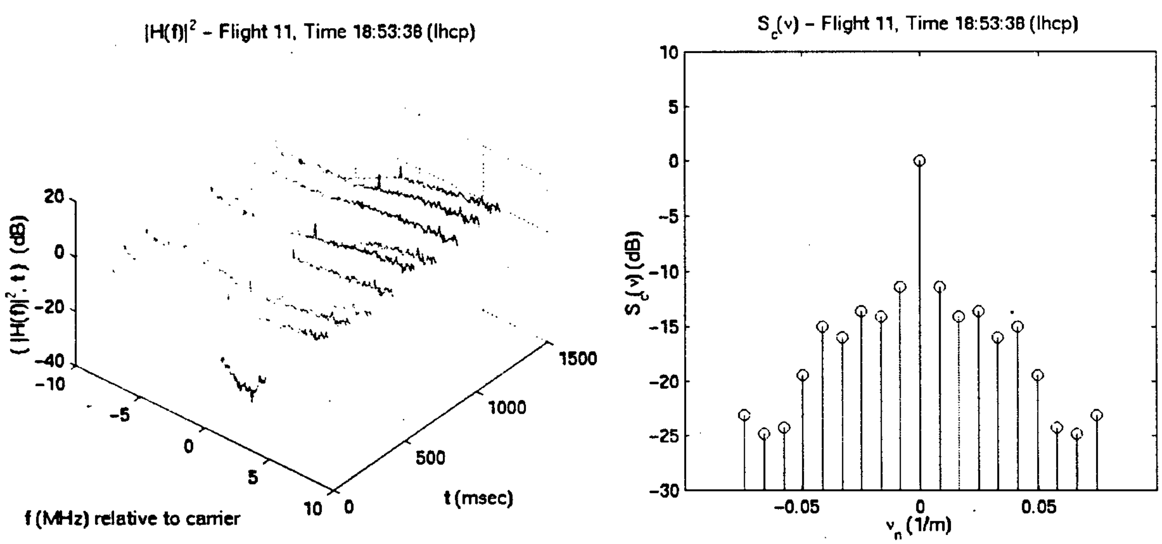

Figure 18: The sampled channel transfer function (left) and the corresponding Doppler spectrum (right) for the 10 segments of ARTM Flight 11, time stamp 18:53:38. This is an example of a channel with average changes – note the shape of the Doppler power spectrum.

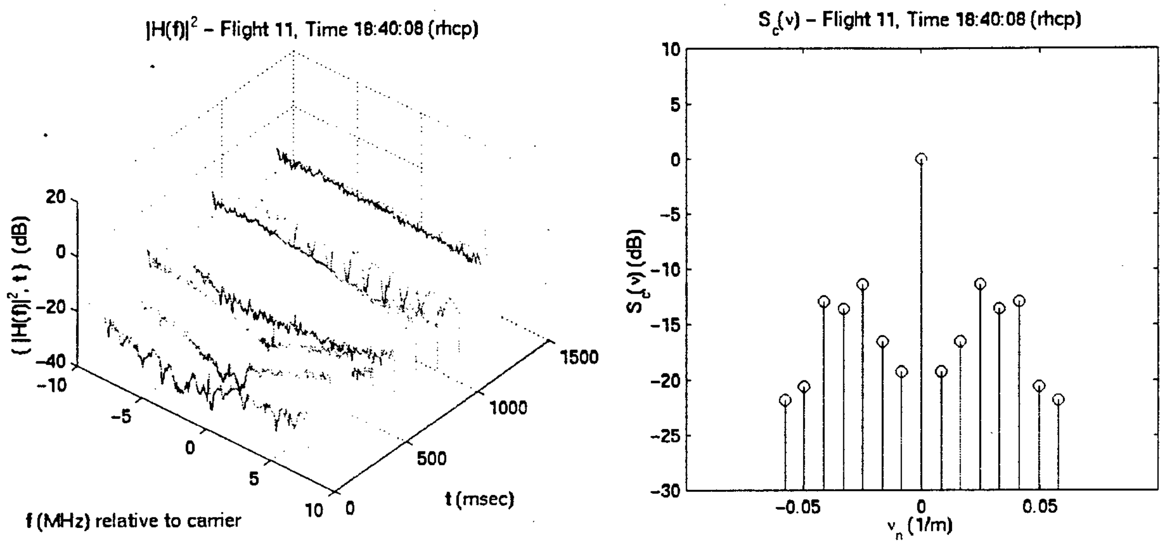

Figure 19: The sampled channel transfer function (left) and the corresponding Doppler spectrum (right) for the 10 segments of ARTM Flight 11, time stamp 18:40:08. This is an example of a channel with fast changes – note the shape of the Doppler power spectrum.

8 CONCLUSIONS

Data from two ARTM channel sounding flights has been analyzed using a frequency domain technique for estimating the number of multipath reflections and the relative complex amplitudes and delays of the multipath reflections. During multipath fading events, the fading was observed to be frequency selective and well modeled by a three-ray model consisting of a line-of-sight propagation path; a strong specular reflective path with relative amplitude greater than 0.5 and excess delay approximately 30 to 70 ns; and a weaker specular reflective path with relative amplitude less than 0.5 and excess delay approximately 175 to 325 ns. It was determined that the spatial sampling rate of the channel sounding procedure did not provide adequate bandwidth to determine the basic form of the dynamic channel. A modification of the channel sounding technique with continuous sampling and increased spatial sample rate is recommended.

9 APPENDIX: MODEL PARAMETERS

9.1 Flight 10 (RHCP)

	2-Ray Model		3-Ray Model			
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
16.16.19						
1	0.93	17.8	0.95	18.2	0.04	205.6
2	0.95	15.7	0.98	16.2	0.04	206.5
3	0.70	22.7	0.99	3.8	0.52	187.3
4	0.67	31.0	0.66	30.7	0.07	138.6
5	0.42	38.4	0.42	38.6	0.03	176.1
6	0.38	48.8	0.36	60.5	0.07	195.9
7	0.00	0.0	1.68	12.4	0.03	214.8
8	0.00	0.0	0.37	27.3	0.03	200.6
9	0.00	0.0	1.60	12.6	0.06	189.4
10	0.00	0.0	1.68	13.1	0.06	190.8
16.19.03						
1	0.83	22.5	1.19	17.7	0.03	250.3
2	0.87	19.0	0.84	18.3	0.04	251.3
3	1.11	13.9	0.90	13.4	0.00	267.8
4	0.90	11.9	0.91	10.3	0.01	376.3
5	0.79	12.7	0.82	10.8	0.01	263.2
6	0.79	12.5	0.82	10.6	0.02	278.1
7	0.86	28.2	0.90	24.7	0.06	147.6
8	0.86	30.3	0.90	26.4	0.06	150.8
9	0.82	40.0	1.13	27.3	0.33	233.5
10	0.79	59.2	0.83	60.0	0.07	256.7
16.30.17						
1	0.12	14.3	0.21	7.2	0.02	215.7
2	0.66	27.0	0.76	45.7	0.26	137.5
3	0.49	21.8	0.49	21.3	0.04	192.7
4	0.52	20.0	0.52	19.7	0.03	196.9
5	0.56	19.9	0.56	19.6	0.03	192.2
6	0.58	19.5	0.58	19.3	0.02	190.3
7	0.60	21.7	0.59	21.5	0.03	194.5
8	0.59	23.1	0.58	22.8	0.04	195.0
9	0.57	27.4	0.57	27.3	0.04	179.1
10	0.53	28.3	0.53	28.0	0.05	185.9
16.30.29						
1	0.48	36.7	0.54	29.0	0.04	187.3
2	0.50	33.8	0.49	33.4	0.06	189.1
3	0.45	29.1	0.45	28.8	0.06	182.6
4	0.49	24.4	0.48	24.0	0.06	184.1
5	0.49	24.3	0.49	23.7	0.06	192.7
6	0.49	24.4	0.49	24.0	0.04	192.3
7	0.50	26.5	0.49	25.8	0.06	192.6
8	0.53	24.9	0.52	24.5	0.05	189.8
9	0.56	23.6	0.55	23.2	0.05	194.1
10	0.55	21.4	0.55	21.1	0.03	188.4
16.30.41						

1	0.52	33.6	0.52	33.4	0.02	197.5
2	0.51	33.3	0.50	32.9	0.05	197.8
3	0.56	29.9	0.56	29.6	0.05	188.9
4	0.52	29.8	0.51	29.4	0.05	194.1
5	0.59	29.9	0.59	29.4	0.05	192.9
6	0.52	32.8	0.51	32.2	0.07	194.3
7	0.55	33.5	0.55	33.1	0.04	196.7
8	0.55	35.2	0.55	34.9	0.03	199.3
9	0.58	31.1	0.57	30.8	0.03	199.0
10	0.60	31.5	0.60	31.2	0.04	194.6
16.31.46						
1	0.93	22.4	0.91	21.9	0.05	134.6
2	0.96	16.5	0.97	16.6	0.02	286.0
3	0.95	16.8	0.94	16.6	0.01	264.0
4	0.92	20.5	0.91	20.2	0.03	173.6
5	0.92	19.3	0.90	18.8	0.09	156.9
6	0.87	21.5	0.86	21.0	0.10	158.4
7	0.85	20.9	0.82	19.3	0.08	88.3
8	0.85	22.8	0.81	19.9	0.11	74.6
9	0.54	16.9	0.54	16.5	0.04	221.1
10	0.43	28.4	0.42	27.7	0.06	217.6
16.32.37						
1	0.93	17.6	0.92	17.5	0.02	234.3
2	0.90	17.5	0.90	17.4	0.02	236.1
3	0.96	14.6	0.96	14.6	0.01	307.9
4	0.96	14.9	0.97	15.3	0.01	100.6
5	0.67	26.4	0.67	26.5	0.02	142.4
6	0.68	28.7	0.69	28.8	0.02	141.5
7	0.73	32.3	0.73	32.4	0.02	167.2
8	0.72	46.3	0.74	47.1	0.05	129.1
9	0.44	54.8	0.44	54.8	0.02	209.6
10	0.46	56.2	0.50	44.3	0.01	211.7
16.35.17						
1	0.19	46.7	0.31	38.8	0.08	113.2
2	0.22	48.5	0.21	47.6	0.09	267.2
3	0.19	50.9	0.18	50.1	0.08	268.1
4	0.52	49.6	0.52	49.6	0.03	190.6
5	0.53	50.3	0.53	50.2	0.04	206.6
6	0.48	71.0	0.46	71.0	0.06	219.2
7	0.47	64.2	0.46	64.2	0.04	209.9
8	0.56	57.7	0.58	43.4	0.08	344.7
9	0.55	52.8	0.57	38.1	0.08	347.5
10	0.37	46.6	0.36	46.3	0.09	386.3
16.35.33						
1	0.14	116.7	0.13	20.4	0.09	199.3
2	0.19	139.2	0.08	0.4	0.08	141.7
3	0.04	134.7	0.06	71.3	0.08	181.0
4	0.09	73.4	0.14	38.2	0.06	167.7
5	0.15	52.4	0.17	30.5	0.07	199.4
6	0.06	118.9	0.06	80.8	0.06	202.9
7	0.20	68.7	0.20	69.4	0.06	192.2
8	0.20	64.1	0.28	25.1	0.08	175.8
9	0.19	52.9	0.31	29.0	0.08	128.3
10	0.17	61.7	0.26	36.0	0.07	120.4
16.35.46						
1	0.40	108.4	0.20	70.4	0.32	115.2
2	0.40	109.5	0.19	44.4	0.40	100.1

3	0.10	63.2	0.24	11.9	0.04	105.5
4	0.15	54.6	0.29	27.9	0.04	201.7
5	0.18	65.2	0.16	67.2	0.10	197.6
6	0.29	59.8	0.29	60.8	0.11	187.0
7	0.27	69.0	0.29	51.6	0.07	193.3
8	0.26	67.1	0.29	48.0	0.08	183.9
9	0.26	66.1	0.28	49.9	0.11	206.5
10	0.28	48.9	0.35	34.8	0.06	198.1
16.35.57						
1	0.35	148.8	0.39	46.0	0.23	119.9
2	0.32	152.6	0.43	74.7	0.29	122.9
3	0.18	132.4	0.18	44.8	0.13	198.3
4	0.16	132.4	0.16	49.1	0.13	200.3
5	0.17	138.2	0.19	44.7	0.06	196.2
6	0.16	125.6	0.15	51.8	0.07	202.1
7	0.20	61.3	0.21	52.3	0.08	190.7
8	0.22	58.8	0.23	47.7	0.11	196.9
9	0.32	63.2	0.59	78.0	0.41	106.1
10	0.33	58.0	0.34	51.9	0.09	192.9
16.36.36						
1	0.25	71.5	0.40	29.8	0.06	166.8
2	0.27	73.5	0.35	38.7	0.07	180.0
3	0.32	60.3	0.32	54.5	0.07	203.1
4	0.31	60.4	0.32	53.6	0.07	193.4
5	0.31	55.1	0.29	60.3	0.12	122.9
6	0.25	59.5	0.28	29.2	0.10	172.0
7	0.14	117.4	0.15	44.9	0.12	115.9
8	0.13	117.7	0.16	64.7	0.14	112.2
9	0.27	59.8	0.27	63.9	0.09	209.3
10	0.26	58.8	0.26	59.0	0.07	209.1
16.37.01						
1	0.43	118.3	0.84	28.2	0.58	98.0
2	0.38	124.6	0.89	31.1	0.60	93.7
3	0.35	43.3	0.41	44.0	0.16	104.7
4	0.36	45.1	0.40	43.9	0.17	108.4
5	0.51	49.5	0.66	41.4	0.18	109.3
6	0.57	40.7	0.71	33.2	0.16	111.8
7	0.71	31.3	0.68	13.6	0.14	64.7
8	0.72	28.5	0.69	13.7	0.14	63.7
9	0.62	36.5	0.67	27.9	0.11	79.0
10	0.56	40.9	0.60	27.5	0.08	111.5
16.37.09						
1	0.49	53.2	0.50	47.9	0.04	235.6
2	0.53	39.9	0.51	45.1	0.03	214.5
3	0.45	28.0	0.42	32.7	0.12	138.4
4	0.32	45.8	0.29	50.8	0.09	208.5
5	0.50	56.8	0.50	57.6	0.07	199.5
6	0.49	50.6	0.49	50.8	0.03	187.8
7	0.49	47.6	0.49	48.0	0.12	189.2
8	0.48	46.3	0.47	46.3	0.08	192.1
9	0.60	44.0	0.86	44.6	0.33	76.4
10	0.61	41.5	0.65	33.5	0.05	204.3
16.37.31						
1	0.58	51.1	0.60	45.0	0.16	370.7
2	0.49	52.4	0.52	45.9	0.11	351.7
3	0.35	55.7	0.41	41.7	0.09	369.2
4	0.34	59.6	0.39	45.0	0.13	380.5

5	0.14	54.5	0.17	40.6	0.12	194.4
6	0.17	38.5	0.35	16.8	0.10	189.7
7	0.29	48.7	0.42	20.9	0.07	202.9
8	0.35	35.4	0.35	33.7	0.10	179.5
9	0.39	27.0	0.53	16.2	0.04	184.3
10	0.28	40.7	0.28	40.3	0.05	187.4
16.59.07						
1	0.31	308.5	0.09	44.4	0.31	309.6
2	0.31	309.6	0.24	10.2	0.29	309.7
3	0.14	324.9	0.94	2.0	0.12	327.5
4	0.16	332.0	0.89	1.9	0.13	331.2
5	0.10	268.1	0.91	2.3	0.07	269.3
6	0.13	284.4	0.49	17.6	0.15	287.2
7	0.19	300.6	0.88	2.5	0.16	298.8
8	0.15	298.2	0.86	2.9	0.14	293.9
9	0.43	284.9	0.03	89.6	0.41	285.3
10	0.42	284.2	1.48	0.9	0.39	283.9
17.00.27						
1	0.24	46.3	0.24	46.1	0.02	310.1
2	0.23	54.5	0.22	54.3	0.02	340.1
3	0.22	38.9	0.32	26.3	0.01	297.9
4	0.22	47.1	0.31	31.1	0.02	299.4
5	0.23	59.8	0.31	38.4	0.02	261.2
6	0.28	43.3	0.37	30.7	0.02	262.1
7	0.40	34.2	0.48	26.0	0.04	216.1
8	0.29	57.2	0.35	38.2	0.06	217.4
9	0.35	40.4	0.42	29.5	0.01	270.9
10	0.36	35.3	0.44	26.3	0.02	419.9
17.00.50						
1	0.29	66.6	0.29	67.0	0.03	272.2
2	0.29	74.7	0.37	39.9	0.02	315.5
3	0.12	82.0	2.71	50.9	2.58	52.9
4	0.17	44.1	0.27	28.1	0.01	318.1
5	0.33	35.0	0.41	26.1	0.02	242.9
6	0.24	61.1	0.31	40.0	0.00	308.5
7	0.19	39.6	0.29	26.1	0.01	299.0
8	0.28	26.2	0.37	19.3	0.01	314.1
9	0.31	46.9	0.39	33.4	0.02	290.3
10	0.26	57.1	0.26	57.0	0.04	284.9
17.01.15						
1	0.09	353.1	0.11	38.7	0.10	358.9
2	0.07	348.8	0.08	58.5	0.07	349.8
3	0.13	354.8	1.08	2.0	0.11	358.5
4	0.12	350.2	1.19	1.8	0.11	354.3
5	0.10	336.0	0.81	2.7	0.09	339.2
6	0.09	331.0	0.14	30.2	0.09	336.3
7	0.07	362.4	0.12	52.4	0.06	368.3
8	0.09	360.2	0.63	4.9	0.08	353.9
9	0.13	345.6	0.13	35.5	0.12	346.2
10	0.15	352.1	0.21	23.6	0.16	355.3
17.01.38						
1	0.45	40.6	0.45	40.9	0.04	450.7
2	0.55	26.2	0.61	21.1	0.04	387.8
3	0.48	23.8	0.54	19.0	0.11	276.3
4	0.45	28.1	0.51	22.1	0.14	271.6
5	0.35	45.6	0.42	32.6	0.07	298.7
6	0.52	22.0	0.52	22.0	0.07	390.3

7	0.55	251.1	0.70	14.0	0.23	237.6
8	0.55	252.0	0.69	15.6	0.25	237.5
9	0.65	27.7	0.69	23.2	0.11	371.0
10	0.52	57.7	0.50	72.7	0.16	348.7
17.01.48						
1	0.75	57.8	0.82	36.6	0.05	213.0
2	0.77	38.2	1.30	27.1	0.07	195.5
3	0.87	38.8	1.25	30.0	0.17	201.3
4	0.82	49.5	1.26	37.7	0.16	203.9
5	0.72	48.1	1.25	34.8	0.14	146.8
6	0.71	54.0	0.73	54.5	0.06	156.8
7	0.74	43.7	5.52	58.5	4.80	61.3
8	0.76	52.8	9.04	70.4	8.32	72.6
9	0.68	37.4	0.67	37.3	0.02	191.2
10	0.75	32.9	1.18	26.6	0.06	151.3
17.02.15						
1	0.06	128.0	0.30	23.3	0.04	277.6
2	0.07	122.6	0.31	22.0	0.04	275.9
3	0.27	23.4	0.27	23.2	0.04	290.1
4	0.27	25.2	0.27	24.2	0.03	300.4
5	0.04	67.5	0.07	14.9	0.02	356.4
6	0.08	87.3	0.26	3.4	0.03	361.3
7	0.11	86.9	0.91	1.5	0.02	288.4
8	0.16	87.8	0.51	2.6	0.03	252.4
9	0.12	92.0	0.33	10.0	0.04	293.8
10	0.12	91.2	0.32	8.0	0.04	291.6
17.02.33						
1	0.36	49.8	0.25	38.3	0.14	71.0
2	0.34	51.5	0.10	39.3	0.28	55.9
3	0.20	143.7	0.22	52.5	0.16	118.7
4	0.19	142.4	0.24	43.0	0.13	117.3
5	0.13	58.6	0.21	33.5	0.06	493.0
6	0.13	62.0	0.21	34.8	0.05	504.1
7	0.10	133.5	0.08	56.6	0.10	137.4
8	0.09	126.2	0.20	14.0	0.07	120.2
9	0.12	60.1	0.17	34.5	0.06	136.7
10	0.09	138.5	0.24	24.0	0.05	144.5
17.02.57						
1	0.81	17.1	0.90	18.7	0.16	74.5
2	0.82	15.1	0.89	16.4	0.14	72.4
3	0.87	18.2	0.81	15.7	0.10	92.5
4	0.74	47.5	0.98	35.0	0.30	98.7
5	0.74	34.9	0.83	37.5	0.19	117.1
6	0.72	43.3	0.90	48.5	0.31	109.7
7	0.20	67.5	0.34	29.7	0.03	155.0
8	0.20	69.9	1.78	22.3	0.16	123.8
9	0.77	47.0	0.95	46.2	0.21	96.3
10	0.74	55.3	0.80	43.5	0.08	189.8
17.03.21						
1	0.34	35.7	0.34	34.9	0.03	219.9
2	0.49	17.2	0.38	27.8	0.03	184.8
3	0.42	32.8	0.42	33.1	0.01	329.5
4	0.48	24.7	0.48	24.9	0.00	337.9
5	0.49	19.0	0.49	19.2	0.02	317.7
6	0.56	14.5	0.56	14.5	0.01	316.9
7	0.63	9.5	0.66	8.6	0.04	159.9
8	0.63	9.5	0.65	8.8	0.03	160.9

9	0.67	12.5	0.67	12.4	0.01	253.3
10	0.61	15.4	0.61	15.4	0.01	283.6
17.03.34						
1	0.05	21.9	0.05	20.5	0.02	334.7
2	0.05	96.2	0.05	96.8	0.02	330.6
3	0.07	98.3	0.07	98.4	0.02	304.7
4	0.06	99.5	0.06	99.8	0.02	299.9
5	0.03	101.6	0.14	9.6	0.03	300.4
6	0.03	100.2	0.15	9.4	0.02	296.5
7	0.05	92.5	0.16	14.9	0.04	157.4
8	0.05	92.8	0.16	7.0	0.03	369.1
9	0.05	109.1	0.00	0.0	0.00	0.0
10	0.05	103.7	0.00	0.0	0.00	0.0
17.11.58						
1	0.00	0.0	0.00	0.0	0.00	0.0
2	0.00	0.0	0.00	0.0	0.00	0.0
3	0.00	0.0	0.00	0.0	0.00	0.0
4	0.00	0.0	0.00	0.0	0.00	0.0
5	0.00	0.0	0.00	0.0	0.00	0.0
6	0.00	0.0	0.00	0.0	0.00	0.0
7	0.00	0.0	0.00	0.0	0.00	0.0
8	0.00	0.0	0.00	0.0	0.00	0.0
9	0.00	0.0	0.00	0.0	0.00	0.0
10	0.00	0.0	0.00	0.0	0.00	0.0
17.12.04						
1	0.90	2.1	0.98	1.9	0.02	257.6
2	0.95	2.0	0.96	1.9	0.03	260.3
3	0.60	5.3	0.70	4.5	0.01	332.9
4	0.75	3.5	0.57	5.5	0.02	154.5
5	0.65	12.1	0.67	11.5	0.02	340.9
6	0.79	6.4	0.81	6.1	0.02	355.8
7	0.48	17.0	0.48	17.1	0.01	318.7
8	0.52	14.3	0.52	14.3	0.00	325.0
9	0.54	13.3	0.55	13.1	0.01	312.6
10	0.55	12.4	0.55	12.3	0.01	337.6
17.12.30						
1	0.09	131.1	0.11	22.8	0.07	136.4
2	0.09	129.5	0.17	16.5	0.07	137.3
3	0.12	125.7	0.77	7.8	0.10	139.2
4	0.12	126.6	0.70	6.2	0.09	139.6
5	0.03	164.1	0.91	2.2	0.10	85.7
6	0.10	67.9	0.86	2.5	0.09	86.5
7	0.08	66.8	0.18	11.0	0.13	51.8
8	0.00	0.0	0.45	20.7	0.11	73.7
9	0.07	142.6	0.06	23.3	0.06	151.7
10	0.06	143.1	0.04	63.6	0.06	141.3
17.12.37						
1	0.13	172.8	1.00	3.5	0.09	170.9
2	0.13	172.6	0.95	3.5	0.09	171.7
3	0.13	143.8	0.69	4.7	0.12	171.2
4	0.11	168.8	0.64	4.7	0.11	174.5
5	0.13	195.9	0.81	4.8	0.13	188.4
6	0.15	190.4	0.84	4.0	0.12	188.3
7	0.18	181.8	0.84	2.8	0.06	179.0
8	0.18	181.4	0.80	2.8	0.06	179.3
9	0.07	189.9	0.34	5.0	0.05	220.8
10	0.06	222.5	0.24	7.9	0.05	215.1

17.13.00						
1	0.75	11.1	0.75	10.9	0.02	244.3
2	0.79	9.5	0.79	9.4	0.02	240.8
3	0.83	11.3	0.82	10.9	0.02	177.8
4	0.80	12.3	0.82	10.1	0.02	176.6
5	0.71	16.2	0.71	16.2	0.03	222.1
6	0.64	19.3	0.64	19.3	0.03	221.8
7	0.61	26.5	0.61	26.4	0.05	156.7
8	0.58	26.7	0.58	26.6	0.03	230.4
9	0.72	30.3	0.70	29.5	0.06	148.2
10	0.72	31.9	0.70	31.3	0.05	141.8
17.14.00						
1	0.61	12.1	0.71	10.2	0.03	220.3
2	0.64	11.6	0.62	10.6	0.03	171.1
3	0.62	17.6	0.64	16.5	0.03	195.9
4	0.61	21.0	0.62	19.9	0.03	199.0
5	1.01	7.1	0.93	4.5	0.03	172.6
6	1.00	5.7	0.90	4.7	0.03	174.8
7	0.76	7.2	0.76	7.2	0.01	195.6
8	0.76	7.1	0.76	7.0	0.02	202.2
9	0.81	6.4	0.91	5.4	0.02	201.7
10	0.83	5.4	0.87	4.8	0.01	204.2
17.14.15						
1	0.43	46.7	0.43	47.0	0.02	252.0
2	0.40	49.1	0.40	48.9	0.02	216.2
3	0.50	46.4	0.49	46.2	0.03	326.1
4	0.46	45.5	0.49	40.7	0.03	241.3
5	0.58	47.4	0.59	45.3	0.03	257.4
6	0.57	48.0	0.89	54.2	0.37	75.7
7	0.62	44.9	0.68	39.8	0.07	83.7
8	0.65	45.7	0.71	38.0	0.06	85.8
9	0.50	41.3	0.51	43.3	0.04	232.8
10	0.55	40.7	0.55	41.8	0.04	229.2
17.14.21						
1	0.71	26.1	0.71	26.1	0.01	213.9
2	0.74	27.4	0.32	12.4	0.67	30.5
3	0.61	30.5	0.62	30.6	0.02	167.2
4	0.73	21.5	0.67	10.8	0.55	30.3
5	0.64	21.5	0.64	21.5	0.02	228.2
6	0.71	17.7	0.71	17.7	0.02	160.2
7	0.68	23.8	0.68	23.7	0.03	171.8
8	0.59	31.7	0.59	31.6	0.04	176.0
9	0.54	38.6	0.54	38.5	0.05	222.8
10	0.43	60.0	0.42	60.0	0.07	224.2
17.15.19						
1	0.00	0.0	0.00	0.0	0.00	0.0
2	0.00	0.0	0.00	0.0	0.00	0.0
3	0.14	74.4	0.13	74.1	0.06	162.3
4	0.14	76.0	0.13	74.0	0.06	170.3
5	0.10	78.4	0.10	76.4	0.05	190.0
6	0.10	76.1	0.09	73.2	0.04	185.2
7	0.19	53.2	0.19	53.0	0.02	159.1
8	0.19	53.0	0.19	52.7	0.03	156.8
9	0.15	38.0	0.18	27.4	0.03	171.5
10	0.17	28.3	0.20	22.2	0.03	178.0
17.15.40						
1	0.12	36.7	0.12	35.1	0.03	190.1

2	0.13	32.3	0.13	31.3	0.02	191.8
3	0.12	80.1	0.11	82.1	0.03	207.6
4	0.12	82.2	0.12	84.7	0.03	208.5
5	0.11	58.3	0.11	58.6	0.03	211.6
6	0.12	54.3	0.12	54.6	0.03	211.1
7	0.00	0.0	0.00	0.0	0.00	0.0
8	0.00	0.0	0.07	86.4	0.03	221.7
9	0.15	58.9	0.15	59.1	0.02	222.1
10	0.17	33.4	0.17	32.9	0.02	244.7
17.15.54						
1	0.00	0.0	0.00	0.0	0.00	0.0
2	0.00	0.0	0.00	0.0	0.00	0.0
3	0.22	47.5	0.22	47.4	0.05	229.0
4	0.22	47.5	0.22	47.8	0.05	235.0
5	0.17	52.8	0.16	52.7	0.05	199.7
6	0.16	59.4	0.16	59.7	0.05	206.9
7	0.15	67.8	0.15	68.7	0.03	218.0
8	0.19	48.6	0.19	48.3	0.03	235.6
9	0.24	66.2	0.24	66.6	0.04	178.3
10	0.25	59.9	0.25	60.2	0.04	245.7
17.16.07						
1	0.22	52.3	0.22	52.1	0.01	221.7
2	0.23	48.4	0.23	48.0	0.01	230.4
3	0.24	41.8	0.24	41.0	0.02	230.8
4	0.23	44.2	0.23	43.1	0.02	158.8
5	0.28	38.2	0.28	38.0	0.01	237.0
6	0.26	40.5	0.27	44.5	0.05	112.2
7	0.21	37.1	0.21	36.5	0.02	188.5
8	0.22	35.0	0.22	34.7	0.02	167.5
9	0.29	32.9	0.29	31.5	0.03	184.9
10	0.30	30.9	0.30	28.9	0.03	215.9
17.16.28						
1	0.38	239.0	0.18	30.8	0.34	231.7
2	0.42	238.8	0.13	43.2	0.40	234.5
3	0.13	226.8	0.08	61.4	0.13	225.7
4	0.13	230.9	0.13	34.2	0.13	223.6
5	0.05	242.2	0.08	79.4	0.06	280.3
6	0.08	250.7	0.08	79.2	0.08	262.0
7	0.17	246.9	0.12	83.6	0.13	253.8
8	0.19	256.3	0.14	91.1	0.13	264.2
9	0.13	248.5	0.12	52.9	0.13	258.9
10	0.17	256.1	0.12	56.0	0.18	254.6
17.29.48						
1	0.44	56.3	0.45	56.3	0.06	352.0
2	0.41	54.0	0.42	54.2	0.05	349.4
3	0.54	58.3	0.53	59.0	0.11	389.1
4	0.51	57.9	0.50	58.5	0.09	387.1
5	0.55	61.7	0.56	62.1	0.05	350.7
6	0.62	61.7	1.76	14.9	0.69	94.5
7	0.59	56.0	0.56	56.4	0.09	326.9
8	0.60	57.4	0.58	57.9	0.12	327.6
9	0.71	57.9	0.70	57.1	0.07	359.6
10	0.75	57.9	0.73	57.1	0.08	352.8
17.29.54						
1	0.98	45.0	1.00	45.6	0.05	191.2
2	0.94	47.4	0.98	48.3	0.05	204.9
3	0.81	52.4	0.82	53.2	0.10	172.9

4	0.90	33.2	0.91	33.8	0.07	161.2
5	0.76	23.8	0.77	23.8	0.08	218.9
6	0.71	36.5	0.72	36.5	0.11	210.5
7	0.75	59.4	0.78	60.3	0.08	216.3
8	0.72	64.3	0.76	66.0	0.11	218.9
9	0.72	72.5	0.90	81.4	0.25	124.3
10	0.71	73.1	0.89	82.4	0.25	127.4
17.30.11						
1	0.97	47.3	0.93	46.2	0.04	182.6
2	0.95	33.7	0.90	35.4	0.06	176.3
3	0.80	48.3	0.82	48.5	0.07	113.0
4	0.88	37.4	0.86	36.6	0.06	107.8
5	0.87	34.7	0.83	33.9	0.08	148.5
6	0.82	59.4	0.77	58.4	0.09	205.2
7	0.78	69.2	0.83	70.4	0.14	344.6
8	0.72	72.3	0.75	72.9	0.14	339.9
9	0.90	71.0	0.93	59.3	0.30	306.5
10	0.72	78.8	0.84	83.8	0.35	296.2
17.32.48						
1	0.29	31.5	0.30	32.7	0.03	229.8
2	0.32	29.6	0.33	30.8	0.03	228.7
3	0.28	35.1	0.29	35.5	0.03	199.6
4	0.15	45.2	0.16	45.4	0.02	200.2
5	0.18	61.9	0.19	65.1	0.11	113.7
6	0.18	56.2	0.20	59.5	0.11	111.1
7	0.24	130.9	0.23	66.1	0.23	115.1
8	0.25	132.1	0.11	59.8	0.16	131.3
9	0.42	62.8	0.69	24.9	0.62	71.6
10	0.44	67.8	0.70	25.0	0.64	72.2
17.33.52						
1	0.24	52.0	0.34	37.1	0.40	56.5
2	0.29	47.2	0.39	26.1	0.38	56.2
3	0.27	39.2	0.41	50.9	0.26	78.3
4	0.29	40.7	0.46	53.1	0.29	78.5
5	0.25	39.9	0.22	32.0	0.09	72.1
6	0.15	51.4	0.15	51.6	0.04	181.3
7	0.13	69.6	0.13	69.9	0.02	163.6
8	0.17	53.9	0.18	54.4	0.02	146.1
9	0.18	45.9	0.20	47.7	0.05	140.6
10	0.17	43.6	0.18	45.2	0.05	141.2
17.43.09						
1	0.00	0.0	0.18	24.4	0.07	126.8
2	0.08	130.5	0.06	150.1	0.02	276.4
3	0.11	76.7	0.08	57.8	0.03	232.2
4	0.11	72.7	0.11	76.9	0.04	143.5
5	0.06	62.3	0.96	0.8	0.06	79.1
6	0.06	73.3	0.16	83.2	0.20	91.0
7	0.08	97.6	0.09	113.2	0.06	148.8
8	0.08	99.2	0.90	0.9	0.04	81.6
9	0.13	86.7	0.13	84.7	0.03	146.9
10	0.12	86.0	0.12	84.4	0.03	153.1
17.43.43						
1	0.00	0.0	0.16	81.0	0.05	206.5
2	0.00	0.0	0.16	74.7	0.04	207.9
3	0.32	29.9	0.32	29.7	0.02	258.7
4	0.44	25.1	0.44	24.9	0.02	256.4
5	0.00	0.0	0.22	15.8	0.07	126.2

6	0.00	0.0	0.24	13.3	0.08	132.7
7	0.45	28.0	0.45	29.7	0.05	209.5
8	0.40	30.5	0.40	31.6	0.04	202.3
9	0.29	27.6	0.28	28.7	0.04	193.5
10	0.24	30.0	0.23	31.6	0.04	182.7
17.50.51						
1	0.30	130.8	0.41	63.3	0.34	102.3
2	0.37	120.7	0.27	23.2	0.33	121.9
3	0.14	123.2	0.20	76.1	0.08	305.1
4	0.27	81.8	0.18	69.3	0.13	115.0
5	0.31	166.6	0.20	153.4	0.29	43.4
6	0.28	170.0	0.29	53.6	0.20	144.7
7	0.21	64.2	0.20	64.5	0.09	191.2
8	0.43	41.8	0.20	67.3	0.10	181.5
9	0.29	72.0	0.13	45.8	0.23	88.3
10	0.28	72.0	0.12	46.1	0.22	85.6
17.51.41						
1	0.65	39.9	0.51	40.2	0.20	106.1
2	0.60	61.5	0.60	62.0	0.04	294.0
3	0.51	53.9	0.53	56.2	0.08	173.1
4	0.65	54.5	0.68	56.0	0.09	181.9
5	0.61	51.1	0.64	52.2	0.10	124.8
6	0.74	29.5	0.74	29.7	0.04	272.5
7	0.55	25.0	0.55	24.9	0.08	305.0
8	0.61	26.6	0.61	26.8	0.08	310.1
9	0.34	63.6	0.33	63.7	0.02	200.8
10	0.34	60.5	0.34	60.9	0.04	248.2
17.53.17						
1	0.54	68.2	0.57	69.3	0.13	252.5
2	0.57	68.8	0.61	69.9	0.16	245.5
3	0.26	74.2	0.28	60.8	0.16	184.9
4	0.23	72.9	0.24	60.4	0.15	182.0
5	0.18	82.2	0.17	85.1	0.04	160.1
6	0.18	84.9	0.17	80.5	0.05	189.5
7	0.00	0.0	0.00	0.0	0.00	0.0
8	0.00	0.0	0.00	0.0	0.00	0.0
9	0.14	104.6	0.10	46.7	0.14	119.5
10	0.12	98.0	0.82	24.0	0.23	134.8

9.2 Flight 11 (LHCP)

	2-Ray Model		3-Ray Model			
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
18.53.38						
1	0.88	24.9	0.83	59.7	0.08	207.8
2	0.29	44.8	0.36	32.7	0.03	172.9
3	0.24	55.9	0.30	39.2	0.03	175.7
4	0.74	27.8	0.73	27.8	0.08	152.7
5	0.41	32.7	0.40	37.8	0.09	168.2
6	0.59	25.8	0.59	25.9	0.02	232.3
7	0.91	27.1	0.94	23.0	0.03	197.6
8	0.40	37.0	0.39	39.7	0.05	161.0
9	0.48	34.8	0.48	38.2	0.08	158.8
10	0.86	23.3	0.82	38.9	0.05	227.1
18.54.06						
1	0.81	9.2	0.81	9.0	0.02	156.4
2	0.75	13.6	0.75	13.6	0.01	233.3
3	0.70	18.4	0.73	18.6	0.05	123.0
4	0.76	21.8	0.73	26.1	0.01	174.5
5	0.78	19.6	0.81	20.2	0.04	202.6
6	0.66	21.1	0.63	23.2	0.04	149.7
7	0.70	23.5	0.92	24.7	0.22	48.8
8	0.81	20.8	0.79	21.9	0.03	157.7
9	0.53	21.0	0.55	17.2	0.02	231.5
10	0.64	31.2	0.68	25.0	0.02	256.4
18.54.12						
1	0.90	10.6	0.72	45.7	0.10	96.2
2	0.40	27.1	0.40	26.9	0.02	238.5
3	0.83	8.8	0.83	8.4	0.03	113.6
4	0.81	16.0	0.84	17.4	0.05	72.1
5	0.59	27.4	0.64	22.6	0.03	161.1
6	0.82	14.5	0.84	14.9	0.03	167.6
7	0.66	16.5	0.66	16.6	0.01	233.1
8	0.87	16.9	0.81	29.3	0.03	227.3
9	0.58	20.1	0.60	19.4	0.02	244.3
10	0.54	15.1	0.52	15.8	0.03	231.4
18.54.30						
1	0.71	24.0	0.71	23.9	0.02	235.6
2	0.26	35.4	0.26	34.1	0.02	257.6
3	0.88	33.0	0.82	32.1	0.12	94.0
4	0.70	40.9	0.70	40.6	0.06	148.2
5	0.32	28.6	0.32	28.7	0.03	239.3
6	0.83	35.8	0.85	36.2	0.06	218.1
7	0.56	46.6	0.57	46.7	0.03	173.2
8	0.29	40.2	0.29	40.4	0.04	171.8
9	0.55	48.9	0.54	48.7	0.04	180.4
10	0.70	38.7	0.70	38.8	0.02	234.9
18.54.53						
1	0.64	36.5	0.59	51.4	0.02	197.2
2	0.45	47.2	0.46	48.1	0.05	135.4
3	0.25	49.9	0.25	50.2	0.02	183.5
4	0.89	33.0	0.89	33.0	0.02	232.1
5	0.73	64.4	0.76	42.2	0.03	229.8

6	0.16	48.0	0.16	47.0	0.04	172.3
7	0.83	26.2	0.87	18.8	0.02	230.3
8	0.28	42.0	0.28	42.3	0.04	179.5
9	0.19	44.0	0.19	43.1	0.04	167.0
10	0.74	27.8	0.74	27.8	0.02	169.3
18.55.37						
1	0.69	22.4	0.69	22.4	0.01	233.6
2	0.85	25.4	0.82	36.4	0.02	238.6
3	0.08	78.3	0.08	80.0	0.04	253.8
4	0.57	24.5	0.57	24.3	0.03	236.3
5	0.44	35.6	0.44	35.6	0.02	239.4
6	0.12	43.2	0.12	43.7	0.03	245.3
7	0.87	22.9	0.86	22.7	0.02	153.9
8	0.43	31.5	0.43	31.4	0.02	175.7
9	0.25	31.3	0.25	31.3	0.03	246.1
10	0.74	17.6	0.74	17.6	0.01	237.0
18.55.45						
1	0.35	43.2	0.35	45.1	0.06	176.0
2	0.32	52.1	0.31	52.8	0.06	178.2
3	0.81	36.1	0.85	25.8	0.04	156.0
4	0.39	17.9	0.38	18.5	0.02	223.8
5	0.41	49.3	0.45	41.8	0.05	176.7
6	0.74	27.0	0.81	24.5	0.07	80.8
7	0.42	17.4	0.40	18.3	0.02	231.2
8	0.51	34.8	0.55	28.9	0.04	177.0
9	0.65	21.2	0.71	18.0	0.04	76.2
10	0.34	25.4	0.34	25.7	0.02	240.1

9.3 Flight 12 (Antenna 2)

	2-Ray Model		3-Ray Model			
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
17.41.23						
1	0.85	20.0	0.86	20.3	0.03	142.5
2	0.63	23.4	0.64	24.0	0.04	152.1
3	0.60	21.2	0.60	21.2	0.02	226.2
4	0.78	18.8	0.77	18.4	0.02	115.4
5	0.76	15.2	0.77	15.6	0.03	155.4
6	0.90	14.4	0.90	14.3	0.02	140.2
7	0.82	15.0	0.82	15.1	0.02	221.9
8	0.60	23.0	0.61	21.9	0.06	198.0
9	0.51	14.6	0.54	13.5	0.03	190.7
10	0.71	14.6	0.67	17.5	0.02	177.3
17.41.30						
1	0.12	24.0	0.12	24.1	0.05	175.7
2	0.12	22.0	0.13	18.6	0.03	222.7
3	0.74	2.7	0.76	2.7	0.02	220.7
4	0.86	2.8	0.89	2.7	0.03	219.3
5	0.30	10.7	0.30	10.9	0.02	170.2
6	0.65	3.4	1.16	2.3	0.01	239.3
7	0.94	3.1	0.94	3.1	0.03	184.6
8	0.96	3.3	0.95	3.3	0.03	208.7
9	0.95	3.5	0.96	3.5	0.03	230.3
10	0.96	2.9	0.97	2.9	0.03	226.7
17.41.52						
1	0.66	31.8	0.66	31.7	0.05	192.0
2	0.62	53.5	0.65	38.9	0.02	254.0
3	0.64	33.4	0.63	33.3	0.04	183.8
4	0.62	27.1	0.62	27.1	0.04	305.9
5	0.60	39.5	0.60	39.7	0.04	191.2
6	0.47	49.5	0.57	45.6	0.14	100.2
7	0.58	36.4	0.58	36.2	0.05	282.2
8	0.77	33.6	0.86	37.0	0.12	86.4
9	0.63	64.7	0.82	44.1	0.15	84.8
10	0.47	59.4	0.62	53.9	0.39	57.9
17.42.09						
1	0.45	62.6	0.45	54.5	0.04	202.0
2	0.50	55.4	0.51	44.8	0.04	204.1
3	0.62	53.9	0.62	52.7	0.05	192.1
4	0.61	60.5	0.60	59.0	0.07	217.9
5	0.36	66.5	0.37	55.9	0.06	203.3
6	0.60	56.0	0.62	57.3	0.09	188.5
7	0.61	57.4	0.64	44.6	0.04	205.3
8	0.52	61.7	0.55	50.3	0.08	196.6
9	0.26	73.6	0.24	67.2	0.03	208.3
10	0.67	53.4	0.69	52.1	0.07	192.7
17.42.16						
1	0.48	52.3	0.52	42.4	0.07	192.5
2	0.71	37.8	0.71	38.1	0.04	181.0
3	0.45	44.0	0.44	44.1	0.03	246.4
4	0.45	40.8	0.45	40.6	0.03	194.8
5	0.72	34.4	0.72	34.8	0.03	178.8

6	0.58	24.6	0.58	25.3	0.04	162.7
7	0.20	40.7	0.18	49.6	0.04	183.0
8	0.34	41.1	0.33	42.9	0.07	187.7
9	0.63	36.2	0.63	36.2	0.03	244.9
10	0.45	30.0	0.45	30.3	0.01	232.7
17.42.32						
1	0.83	21.9	0.82	22.3	0.05	188.3
2	0.82	19.3	0.80	19.8	0.06	184.7
3	0.78	23.0	0.79	19.2	0.03	184.7
4	0.81	21.7	0.82	21.9	0.02	149.7
5	0.82	14.7	0.83	17.7	0.04	127.8
6	0.85	15.2	0.85	15.2	0.01	260.8
7	0.73	21.2	0.71	23.1	0.02	168.9
8	0.77	21.9	0.78	22.0	0.03	226.0
9	0.77	14.5	0.77	14.5	0.03	166.3
10	0.87	14.9	0.88	15.0	0.01	221.1
17.42.59						
1	0.67	14.8	0.67	14.6	0.03	182.8
2	0.57	21.7	0.57	21.6	0.02	233.6
3	0.60	23.5	0.60	23.2	0.05	160.3
4	0.78	15.7	0.83	12.7	0.03	196.9
5	0.83	15.2	0.86	12.1	0.02	358.5
6	0.80	15.6	0.84	12.2	0.02	249.4
7	0.86	15.8	0.86	15.9	0.02	238.3
8	0.85	14.4	0.85	14.4	0.00	235.5
9	0.83	16.1	0.83	16.1	0.01	226.9
10	0.64	18.9	0.64	18.9	0.02	172.7
17.52.11						
1	0.88	24.0	0.89	24.4	0.03	153.1
2	0.77	24.5	0.77	22.0	0.03	227.5
3	0.36	23.2	0.35	23.7	0.03	300.7
4	0.65	20.5	0.65	20.5	0.02	113.8
5	0.88	18.9	0.86	20.3	0.04	204.5
6	0.74	25.1	0.75	23.0	0.01	217.8
7	0.31	23.6	0.39	16.5	0.06	208.3
8	0.81	14.5	0.82	14.9	0.03	120.7
9	0.83	18.6	0.83	18.5	0.02	245.4
10	0.69	17.1	0.69	17.2	0.03	233.9
17.53.14						
1	0.93	13.7	0.95	14.1	0.03	174.1
2	0.75	13.1	0.75	13.1	0.00	203.6
3	0.76	15.4	0.76	15.4	0.01	212.7
4	0.93	11.6	0.94	11.6	0.01	214.8
5	0.85	16.3	0.85	16.3	0.01	107.5
6	0.64	18.4	0.64	18.7	0.03	126.1
7	0.66	19.5	0.66	19.2	0.03	152.4
8	0.94	15.2	0.96	15.2	0.03	218.6
9	0.69	23.4	0.69	23.7	0.03	254.1
10	0.51	29.4	0.52	29.0	0.02	227.4
17.53.23						
1	0.95	17.7	0.95	17.7	0.01	229.6
2	0.71	17.8	0.71	17.8	0.03	150.4
3	0.76	12.8	0.76	12.8	0.01	158.9
4	0.94	9.6	0.87	19.9	0.03	257.6
5	0.95	14.4	0.96	14.7	0.02	214.4
6	0.68	16.8	0.59	25.2	0.03	204.6
7	0.94	12.8	0.94	12.8	0.01	248.9

8	0.78	16.1	0.80	17.6	0.06	98.1
9	0.79	22.7	0.79	26.6	0.09	77.6
10	0.58	35.0	0.60	33.7	0.04	215.2
17.53.42						
1	0.83	23.8	0.79	27.5	0.05	126.7
2	0.54	36.5	0.55	36.7	0.03	169.9
3	0.33	50.2	0.33	50.2	0.01	196.2
4	0.55	33.3	0.55	33.3	0.01	235.7
5	0.59	41.0	0.64	45.8	0.11	94.8
6	0.39	26.5	0.45	59.2	0.21	86.0
7	0.34	22.7	0.25	40.7	0.04	133.4
8	0.68	15.3	0.61	21.6	0.01	221.4
9	0.62	16.4	0.56	20.0	0.02	289.2
10	0.45	17.3	0.38	23.4	0.01	238.1
17.54.43						
1	0.93	18.1	0.89	45.9	0.05	187.2
2	0.71	21.1	0.72	21.3	0.02	170.5
3	0.88	18.0	0.83	16.8	0.07	86.9
4	0.75	18.2	0.62	31.1	0.03	181.6
5	0.73	22.0	0.73	22.2	0.04	138.8
6	0.93	17.0	0.94	17.3	0.02	242.0
7	0.69	19.6	0.54	35.4	0.03	182.2
8	0.90	15.5	0.89	15.4	0.03	154.4
9	0.91	16.1	0.92	16.6	0.02	137.3
10	0.84	19.8	0.84	19.7	0.02	200.9
17.56.16						
1	0.11	74.0	0.11	76.1	0.04	207.9
2	0.13	30.8	0.22	13.0	0.04	169.2
3	0.20	104.1	0.19	105.1	0.04	243.5
4	0.27	80.4	0.27	79.8	0.04	207.6
5	0.17	53.5	0.40	13.5	0.11	167.2
6	0.28	78.4	0.28	79.6	0.04	196.8
7	0.12	88.6	0.12	87.9	0.03	209.0
8	0.13	48.9	0.15	54.5	0.14	93.0
9	0.16	91.4	0.14	92.7	0.09	176.6
10	0.19	58.2	0.20	71.1	0.07	171.9
17.56.35						
1	0.43	128.4	0.38	17.9	0.47	131.2
2	0.17	121.1	0.22	24.4	0.11	118.8
3	0.12	144.5	0.14	24.6	0.10	138.2
4	0.11	152.7	0.17	41.2	0.12	154.0
5	0.11	136.3	0.10	43.9	0.08	136.8
6	0.14	133.5	0.07	34.0	0.13	138.6
7	0.16	84.2	0.16	79.8	0.11	147.0
8	0.13	155.2	0.20	61.6	0.06	169.6
9	0.15	145.3	0.14	102.1	0.24	128.4
10	0.09	93.3	0.13	33.9	0.08	174.2
17.58.27						
1	0.14	27.4	0.21	17.0	0.03	208.3
2	0.21	102.5	0.39	13.7	0.17	84.8
3	0.07	117.5	0.27	11.6	0.08	343.5
4	0.37	20.0	0.19	28.8	0.05	343.7
5	0.10	108.0	0.19	19.9	0.03	240.8
6	0.26	45.6	0.34	30.8	0.08	352.6
7	0.07	108.7	0.29	13.2	0.02	299.4
8	0.07	85.4	0.26	24.9	0.07	185.9
9	0.09	71.3	0.12	39.0	0.05	397.3

10	0.14	81.7	0.15	49.8	0.03	236.5
18.15.54						
1	0.39	166.1	0.11	66.7	0.37	166.0
2	0.13	168.4	0.11	169.7	0.13	250.4
3	0.09	38.7	0.07	106.8	0.06	208.6
4	0.12	193.7	0.11	94.3	0.12	200.7
5	0.18	151.7	0.54	115.1	0.57	126.2
6	0.09	192.0	0.08	108.3	0.10	193.5
7	0.06	188.6	0.06	20.6	0.05	189.1
8	0.15	40.1	0.13	41.9	0.10	176.0
9	0.17	28.6	0.15	16.1	0.11	152.8
10	0.11	243.8	0.08	101.7	0.11	241.4
18.19.11						
1	0.38	323.5	0.06	39.7	0.38	323.7
2	0.26	318.3	0.92	5.2	0.39	319.5
3	0.12	295.2	0.25	15.9	0.14	300.8
4	0.10	291.4	0.52	16.9	0.14	299.6
5	0.22	286.7	0.06	32.1	0.21	284.6
6	0.13	317.8	0.81	3.1	0.10	321.4
7	0.13	280.3	0.27	3.7	0.14	282.8
8	0.12	291.0	0.23	4.7	0.12	290.5
9	0.06	278.9	0.08	28.0	0.05	283.8
10	0.09	307.6	0.08	75.5	0.10	308.9
18.19.21						
1	0.51	133.5	0.66	41.1	0.79	122.5
2	0.15	153.7	0.18	16.9	0.14	142.9
3	0.07	160.6	0.19	134.5	0.21	147.0
4	0.38	129.5	0.14	77.3	0.40	125.3
5	0.09	159.6	0.12	51.1	0.06	181.2
6	0.17	128.8	0.17	129.8	0.02	236.1
7	0.08	131.0	0.15	28.6	0.07	144.9
8	0.42	134.7	0.18	28.9	0.43	136.5
9	0.14	90.6	0.06	59.4	0.11	102.6
10	0.49	125.6	0.06	33.4	0.47	122.2
18.20.57						
1	0.68	45.8	0.71	46.6	0.07	153.7
2	0.39	64.6	0.39	64.6	0.01	210.6
3	0.25	48.6	0.25	50.6	0.08	179.0
4	0.32	48.5	0.32	48.7	0.03	240.6
5	0.69	44.5	0.70	44.7	0.06	193.1
6	0.66	56.4	0.67	57.4	0.07	205.1
7	0.27	45.2	0.27	48.4	0.05	176.6
8	0.62	50.9	0.63	51.3	0.06	250.2
9	0.67	49.0	0.68	49.8	0.06	247.8
10	0.46	41.8	0.49	34.9	0.11	146.1
18.21.19						
1	0.64	29.7	0.65	29.2	0.08	316.3
2	0.50	37.8	0.51	35.9	0.07	225.5
3	0.76	44.9	0.77	45.2	0.10	382.6
4	0.77	36.7	0.78	29.3	0.03	229.5
5	0.56	40.0	0.76	14.7	0.03	293.6
6	0.63	55.1	1.21	19.4	0.08	371.7
7	0.70	61.2	0.82	26.3	0.07	392.1
8	0.79	40.7	0.88	17.7	0.04	301.4
9	0.50	41.5	0.53	42.1	0.08	239.8
10	0.75	50.9	0.97	46.0	0.21	275.6
18.21.26						

1	0.55	30.3	0.54	31.2	0.06	278.7
2	0.56	30.1	0.52	33.3	0.08	170.4
3	0.50	41.7	0.49	39.6	0.06	201.0
4	0.40	33.3	0.41	31.4	0.06	218.3
5	0.55	27.1	0.55	27.9	0.05	306.2
6	0.56	22.8	0.58	22.9	0.06	136.7
7	0.41	26.8	0.40	27.7	0.02	243.2
8	0.41	22.4	0.44	20.2	0.03	190.8
9	0.49	26.7	0.51	24.7	0.05	304.8
10	0.47	29.6	0.48	27.8	0.06	189.4
18.21.53						
1	0.30	61.8	0.29	55.8	0.10	261.6
2	0.64	44.0	0.64	44.4	0.04	193.9
3	0.46	64.1	0.50	43.8	0.04	368.8
4	0.31	30.0	0.31	29.5	0.05	193.5
5	0.51	49.1	0.71	19.8	0.13	112.7
6	0.61	29.9	0.79	12.5	0.07	173.2
7	0.39	39.9	0.39	39.6	0.04	198.3
8	0.54	21.5	0.54	21.3	0.04	247.5
9	0.59	35.8	0.59	38.3	0.07	118.6
10	0.54	46.2	0.54	46.6	0.03	194.4
18.22.27						
1	0.11	104.4	0.36	10.7	0.07	177.5
2	0.48	36.6	0.62	20.9	0.13	102.4
3	0.55	35.9	0.58	24.8	0.10	119.9
4	0.54	22.8	0.69	18.6	0.21	93.0
5	0.65	20.6	0.72	13.9	0.03	174.4
6	0.58	23.0	0.71	14.0	0.04	143.4
7	0.53	21.6	0.51	21.0	0.04	163.8
8	0.42	15.5	0.44	14.2	0.03	234.7
9	0.54	14.9	0.51	13.3	0.03	165.6
10	0.65	15.0	0.31	33.7	0.13	153.3
18.22.40						
1	0.85	22.3	0.81	19.6	0.08	95.4
2	0.78	19.5	0.74	22.3	0.03	137.6
3	0.52	29.5	0.52	29.1	0.03	186.9
4	0.74	19.5	0.74	19.5	0.01	143.8
5	0.86	15.5	0.85	15.2	0.05	153.7
6	0.69	21.1	0.71	17.2	0.05	125.2
7	0.67	27.8	0.67	21.2	0.09	98.3
8	0.77	16.6	0.82	15.3	0.11	117.9
9	0.81	16.4	0.90	18.0	0.17	60.9
10	0.85	15.4	0.89	13.9	0.03	137.9
18.32.33						
1	0.89	23.6	0.89	23.6	0.01	212.8
2	0.54	33.0	0.54	33.0	0.03	171.8
3	0.75	15.6	0.76	14.0	0.05	185.3
4	0.88	19.9	0.80	18.8	0.10	173.6
5	0.85	19.8	0.83	19.7	0.06	110.0
6	0.58	39.8	0.59	40.2	0.04	212.6
7	0.81	25.2	0.81	25.2	0.01	242.6
8	0.68	26.4	0.67	26.7	0.04	228.0
9	0.58	40.2	0.71	14.9	0.06	89.4
10	0.47	40.7	0.62	19.9	0.05	135.8
18.33.26						
1	0.69	8.8	0.70	7.9	0.05	157.7
2	0.69	14.7	0.70	13.7	0.07	158.3

3	0.58	29.5	0.61	22.1	0.04	157.4
4	0.83	11.0	0.78	12.9	0.04	111.3
5	0.81	18.4	0.81	19.9	0.03	151.0
6	0.29	45.9	0.42	30.4	0.02	230.6
7	0.29	74.3	0.44	33.7	0.03	228.5
8	0.55	52.9	0.60	49.0	0.06	167.6
9	0.44	38.9	0.46	35.5	0.03	170.9
10	0.46	15.9	0.36	24.3	0.04	161.1
18.33.36						
1	0.95	9.8	0.94	11.2	0.01	245.2
2	0.91	9.0	0.89	11.4	0.02	129.4
3	0.90	7.9	0.87	9.6	0.02	157.0
4	0.82	9.1	0.77	11.5	0.01	153.4
5	0.90	10.6	0.89	11.5	0.01	142.4
6	0.88	11.8	0.85	12.7	0.03	234.3
7	0.80	10.0	0.78	10.7	0.02	129.0
8	0.78	7.8	0.80	7.8	0.03	230.2
9	0.60	15.6	0.65	15.4	0.04	189.6
10	0.63	16.9	0.60	19.3	0.02	217.3
18.33.43						
1	0.92	22.7	0.93	22.9	0.02	176.4
2	0.61	25.0	0.61	24.9	0.03	224.0
3	0.73	18.4	0.73	18.5	0.03	149.7
4	0.90	16.6	0.89	16.5	0.01	143.9
5	0.76	29.1	0.77	29.8	0.04	122.0
6	0.65	28.3	0.64	28.4	0.03	259.2
7	0.81	26.1	0.81	25.9	0.03	255.3
8	0.87	21.7	0.90	22.6	0.04	111.6
9	0.73	29.5	0.73	29.7	0.05	234.2
10	0.67	32.6	0.67	33.7	0.06	187.9
18.33.50						
1	0.70	34.9	0.69	34.5	0.04	186.2
2	0.45	51.3	0.45	51.2	0.03	199.1
3	0.68	52.4	0.81	38.4	0.08	204.1
4	0.62	37.0	0.70	29.0	0.04	235.5
5	0.86	30.0	0.89	26.8	0.01	201.6
6	0.60	33.7	0.69	31.3	0.04	204.5
7	0.68	34.3	0.77	31.1	0.08	203.5
8	0.78	27.9	0.83	24.3	0.04	200.0
9	0.64	29.2	0.71	23.6	0.03	217.7
10	0.67	43.2	0.73	33.8	0.03	228.9
18.35.42						
1	0.21	27.3	0.04	131.6	0.21	528.2
2	0.05	109.0	0.06	103.6	0.14	559.1
3	0.05	107.1	0.10	184.4	0.03	722.3
4	0.02	105.3	0.11	222.6	0.13	656.9
5	0.04	101.0	0.09	260.6	0.10	682.8
6	0.03	100.9	0.11	203.5	0.10	657.7
7	0.04	115.7	0.04	114.2	0.08	744.2
8	0.02	96.7	0.10	221.1	0.06	762.9
9	0.22	18.9	0.06	183.3	0.03	707.3
10	0.13	23.2	0.04	156.0	0.07	655.0
18.47.43						
1	0.31	82.9	0.30	81.0	0.37	812.1
2	0.13	97.2	0.12	97.1	0.13	811.5
3	0.04	104.4	0.07	172.9	0.05	811.7
4	0.07	101.2	0.07	176.1	0.02	775.8

5	0.05	108.4	0.08	177.1	0.15	810.4
6	0.04	108.6	0.05	173.8	0.02	763.9
7	0.03	107.7	0.05	175.0	0.03	802.9
8	0.10	99.2	0.09	101.2	0.11	806.0
9	0.05	117.5	0.05	171.6	0.03	780.2
10	0.04	103.7	0.06	174.2	0.02	799.3
18.57.25						
1	0.06	29.7	0.05	27.9	0.05	188.0
2	0.31	31.1	0.09	64.1	0.04	168.9
3	0.07	170.7	0.01	97.6	0.06	172.4
4	0.17	15.5	0.04	33.1	0.04	185.6
5	0.07	70.8	0.07	64.1	0.04	187.5
6	0.23	25.3	0.17	38.2	0.05	181.4
7	0.14	72.4	0.14	72.9	0.05	190.5
8	0.20	29.6	0.20	29.1	0.04	187.7
9	0.16	60.7	0.16	61.0	0.04	193.4
10	0.13	78.0	0.13	79.1	0.03	200.3

9.4 Flight 12 (Antenna 3)

	2-Ray Model			3-Ray Model		
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
17.41.23						
1	0.91	18.9	0.91	18.8	0.01	227.9
2	0.83	12.0	0.83	11.8	0.03	184.4
3	0.79	18.7	0.69	31.6	0.02	164.1
4	0.79	13.3	0.79	13.5	0.02	159.8
5	0.85	13.6	0.85	13.6	0.01	275.1
6	0.70	24.4	0.68	23.8	0.07	151.6
7	0.55	9.4	0.45	12.1	0.02	233.8
8	0.45	22.7	0.46	21.9	0.05	182.9
9	0.14	75.0	0.13	70.5	0.06	170.2
10	0.36	24.7	0.34	28.3	0.05	128.6
17.41.30						
1	0.18	8.5	0.07	101.2	0.04	209.6
2	0.15	28.1	0.14	32.3	0.04	152.1
3	0.05	58.1	0.05	55.9	0.02	231.1
4	0.09	45.1	0.09	45.0	0.02	268.7
5	0.10	38.8	0.10	36.5	0.02	227.2
6	0.23	12.8	0.46	4.8	0.03	146.0
7	0.29	12.3	0.36	9.3	0.02	220.5
8	0.41	8.3	0.51	5.6	0.02	146.4
9	0.24	18.3	0.22	23.1	0.04	145.3
10	0.28	15.3	0.29	14.1	0.02	222.8
17.41.52						
1	0.68	22.3	0.68	22.3	0.03	171.4
2	0.59	24.4	0.59	23.8	0.02	200.1
3	0.72	25.1	0.74	27.4	0.07	94.0
4	0.78	15.7	0.77	16.7	0.03	168.1
5	0.66	22.2	0.66	22.4	0.01	270.6
6	0.74	18.8	0.78	14.9	0.03	111.2
7	0.75	10.2	0.75	10.3	0.02	147.6
8	0.79	19.5	0.83	15.7	0.03	112.9
9	0.79	15.4	0.79	15.4	0.01	238.3
10	0.76	13.5	0.75	14.0	0.04	182.9
17.42.09						
1	0.27	51.4	0.26	50.9	0.09	203.1
2	0.64	50.9	0.65	51.4	0.09	206.5
3	0.43	67.8	0.43	67.9	0.08	209.4
4	0.43	72.4	0.43	72.8	0.08	212.1
5	0.77	36.7	0.75	43.8	0.04	202.4
6	0.41	46.9	0.40	46.8	0.05	199.8
7	0.71	31.8	0.71	31.9	0.02	194.4
8	0.59	33.0	0.59	33.0	0.03	247.2
9	0.57	38.8	0.57	38.8	0.03	219.9
10	0.73	25.6	0.74	25.9	0.04	176.8
17.42.16						
1	0.71	38.6	0.71	38.7	0.03	192.9
2	0.59	48.3	0.58	47.9	0.07	201.4
3	0.69	35.3	0.79	21.1	0.02	227.4
4	0.73	34.9	0.80	24.8	0.01	229.1
5	0.49	59.2	0.58	37.0	0.03	191.5

6	0.69	38.7	0.69	38.7	0.01	193.1
7	0.66	55.8	0.69	48.0	0.05	198.5
8	0.60	52.7	0.65	43.2	0.05	181.5
9	0.56	45.8	0.61	36.6	0.04	182.2
10	0.44	41.1	0.44	41.1	0.05	184.8
17.42.32						
1	0.64	22.5	0.65	23.1	0.03	114.3
2	0.83	15.2	0.82	15.1	0.01	182.1
3	0.86	11.9	0.86	11.8	0.01	180.4
4	0.53	26.2	0.52	25.9	0.03	193.2
5	0.71	12.3	0.71	12.0	0.05	180.1
6	0.69	15.8	0.73	17.2	0.06	133.5
7	0.65	21.8	0.65	21.7	0.04	181.0
8	0.80	12.4	2.86	26.8	2.09	33.0
9	0.66	20.0	0.65	20.0	0.01	172.5
10	0.68	15.3	0.68	15.3	0.03	229.5
17.42.59						
1	0.67	16.3	0.67	16.5	0.04	193.9
2	0.46	29.8	0.45	32.2	0.06	115.2
3	0.73	17.4	0.73	17.7	0.06	205.7
4	0.70	15.3	0.70	15.6	0.04	198.8
5	0.72	18.0	0.73	19.0	0.05	187.4
6	0.81	10.9	0.81	11.1	0.04	151.4
7	0.75	14.7	0.76	14.8	0.02	170.2
8	0.85	13.9	0.86	14.2	0.02	134.1
9	0.85	11.0	0.85	11.0	0.02	179.2
10	0.78	15.6	0.78	15.5	0.01	267.1
17.52.11						
1	0.69	31.8	0.69	31.8	0.01	199.2
2	0.31	53.4	0.31	53.5	0.04	202.5
3	0.69	46.7	0.71	47.1	0.06	201.4
4	0.48	43.3	0.48	43.3	0.03	185.5
5	0.37	51.7	0.43	39.1	0.05	171.4
6	0.60	46.3	0.59	45.9	0.07	199.7
7	0.22	52.2	0.25	43.9	0.04	203.4
8	1.82	28.2	0.54	30.3	0.03	190.3
9	0.47	48.6	0.47	48.9	0.07	194.9
10	0.53	37.0	0.61	24.2	0.01	188.7
17.53.14						
1	0.78	12.7	0.80	14.2	0.06	86.2
2	0.85	16.2	0.86	16.4	0.03	98.0
3	0.92	15.2	0.92	15.2	0.00	244.5
4	0.80	13.3	0.81	15.1	0.07	97.7
5	0.69	22.2	0.70	24.4	0.06	98.2
6	0.88	17.0	0.88	16.9	0.01	213.0
7	0.81	12.7	0.83	10.8	0.00	174.0
8	0.87	16.9	0.90	12.4	0.00	228.5
9	0.79	14.1	0.80	13.1	0.05	111.4
10	0.46	35.9	0.54	24.5	0.02	247.2
17.53.23						
1	0.46	41.5	0.63	21.4	0.02	101.7
2	0.92	23.7	0.98	16.1	0.04	83.6
3	0.54	33.5	0.60	28.8	0.06	92.1
4	0.68	28.7	0.77	32.3	0.14	72.4
5	0.74	23.9	0.85	17.0	0.09	68.0
6	0.59	23.2	0.62	38.2	0.17	72.2
7	0.77	17.5	0.73	25.0	0.08	83.7

8	0.56	25.8	0.55	32.8	0.10	83.5
9	0.48	34.2	0.61	48.4	0.25	79.1
10	0.61	22.0	0.57	26.7	0.08	96.8
17.53.42						
1	0.77	31.2	0.97	36.0	0.24	72.7
2	0.81	23.9	0.89	26.1	0.12	77.2
3	0.71	26.1	0.72	26.4	0.01	164.0
4	0.75	29.0	0.78	24.6	0.03	244.7
5	0.81	25.6	0.83	21.5	0.01	258.1
6	0.54	25.9	0.50	32.3	0.08	103.2
7	0.76	23.4	0.83	16.0	0.02	210.4
8	0.54	25.8	0.47	33.9	0.07	108.2
9	0.61	24.4	0.60	19.6	0.05	122.1
10	0.51	27.5	0.59	17.7	0.03	128.1
17.54.43						
1	0.12	40.4	0.32	13.0	0.02	197.8
2	0.35	25.5	0.31	31.5	0.07	118.9
3	0.25	36.4	0.29	28.0	0.03	227.2
4	0.44	23.7	0.48	22.3	0.05	121.1
5	0.48	21.2	0.49	21.7	0.07	117.4
6	0.31	25.7	0.35	21.8	0.02	251.9
7	0.56	23.4	0.58	23.1	0.06	121.8
8	0.48	25.3	0.43	30.9	0.09	104.5
9	0.36	28.8	0.40	25.0	0.02	259.0
10	0.72	30.2	0.74	28.2	0.03	169.4
17.56.16						
1	0.29	15.0	0.18	106.1	0.02	213.3
2	0.37	14.5	0.32	4.8	0.09	83.2
3	0.18	100.9	0.10	41.3	0.18	101.5
4	0.16	86.4	0.15	91.8	0.09	159.3
5	0.49	32.8	0.96	1.8	0.09	139.5
6	0.17	89.5	0.25	36.5	0.12	102.8
7	0.13	104.3	0.27	16.7	0.11	116.0
8	0.38	94.0	0.34	25.9	0.23	104.4
9	0.11	37.4	0.10	21.4	0.09	101.5
10	0.25	63.6	0.24	46.6	0.15	186.1
17.56.35						
1	0.25	114.3	0.10	65.4	0.22	126.5
2	0.41	139.4	0.31	39.8	0.34	127.6
3	0.20	42.6	0.27	27.1	0.04	128.9
4	0.35	40.4	0.38	31.4	0.07	147.7
5	0.19	127.9	0.34	67.9	0.28	105.8
6	0.15	128.4	0.27	73.0	0.23	102.2
7	0.13	129.3	0.26	14.3	0.12	141.8
8	0.15	107.6	0.14	50.4	0.14	129.7
9	0.10	147.7	0.06	33.6	0.08	141.5
10	0.18	54.9	0.49	30.7	0.11	123.2
17.58.27						
1	0.14	63.0	0.14	64.2	0.03	233.7
2	0.16	65.1	0.18	49.0	0.06	159.3
3	0.12	138.3	0.13	48.9	0.06	127.1
4	0.12	57.2	0.10	55.3	0.05	161.4
5	0.10	98.2	0.11	27.4	0.03	166.5
6	0.15	41.3	0.25	24.3	0.05	138.3
7	0.16	46.0	0.25	23.7	0.08	360.3
8	0.12	41.4	0.12	44.6	0.04	152.1
9	0.12	40.5	0.25	14.7	0.05	146.1

10	0.17	29.4	0.09	41.1	0.02	234.7
18.15.54						
1	0.16	31.3	0.17	30.0	0.05	183.0
2	0.16	71.3	0.16	71.6	0.06	227.4
3	0.12	52.9	0.11	52.7	0.04	269.9
4	0.11	238.7	0.15	10.4	0.09	237.1
5	0.07	198.4	1.87	3.0	0.06	220.2
6	0.11	124.8	0.14	20.0	0.07	209.8
7	0.12	137.0	0.18	2.9	0.12	250.2
8	0.06	232.0	0.69	2.5	0.06	228.0
9	0.13	76.5	0.17	25.2	0.05	205.8
10	0.16	84.8	0.15	90.1	0.10	226.7
18.19.11						
1	0.20	318.3	0.05	127.7	0.20	319.5
2	0.11	263.2	0.04	129.0	0.11	263.9
3	0.10	320.2	0.05	129.6	0.10	321.9
4	0.10	248.2	0.06	141.9	0.10	247.1
5	0.23	286.6	0.06	103.3	0.24	286.4
6	0.11	304.0	0.07	67.6	0.12	299.0
7	0.15	262.5	0.05	138.0	0.15	260.1
8	0.13	267.6	0.05	79.9	0.13	268.7
9	0.15	295.4	0.04	135.2	0.15	294.5
10	0.18	248.3	0.03	127.8	0.18	247.2
18.19.21						
1	0.16	103.6	0.27	32.9	0.21	72.6
2	0.43	122.5	0.45	121.7	0.04	236.7
3	0.18	113.4	0.29	87.0	0.36	106.7
4	0.17	135.2	0.18	142.6	0.03	208.6
5	0.14	130.3	0.14	131.2	0.06	176.9
6	0.30	123.9	0.29	130.9	0.03	228.1
7	0.28	127.2	0.28	123.6	0.02	246.7
8	0.35	133.2	0.36	131.4	0.06	223.3
9	0.22	122.7	0.44	8.8	0.12	123.0
10	0.56	124.2	0.32	12.1	0.39	118.1
18.20.57						
1	0.80	24.9	0.83	19.5	0.01	244.2
2	0.76	30.4	0.84	34.2	0.12	87.1
3	0.75	28.4	0.80	30.5	0.09	106.1
4	0.71	25.5	0.74	27.3	0.06	95.4
5	0.87	28.1	0.87	28.1	0.03	235.0
6	0.57	23.7	0.57	23.7	0.01	189.8
7	0.90	21.5	0.98	24.1	0.10	89.0
8	0.82	26.4	0.89	28.7	0.09	88.0
9	0.71	21.2	0.73	22.6	0.05	102.9
10	0.66	33.6	0.66	33.7	0.02	242.0
18.21.19						
1	0.51	24.7	0.54	22.5	0.03	189.3
2	0.58	32.5	0.57	31.4	0.06	101.5
3	0.73	13.6	0.79	9.9	0.01	277.3
4	0.57	16.6	0.65	11.6	0.02	126.6
5	0.78	14.4	0.84	9.7	0.03	336.2
6	0.79	9.5	0.76	11.1	0.03	367.1
7	0.66	16.9	0.67	16.3	0.06	223.6
8	0.82	12.4	0.86	9.5	0.02	254.2
9	0.73	9.5	0.73	9.7	0.03	195.3
10	0.75	18.5	0.81	12.4	0.05	350.9
18.21.26						

1	0.49	40.8	0.51	36.9	0.05	184.8
2	0.52	49.4	0.55	46.3	0.09	178.0
3	0.54	29.2	0.48	41.9	0.16	182.6
4	0.50	38.0	0.50	38.1	0.07	185.5
5	0.43	37.0	0.46	41.5	0.09	91.5
6	0.57	31.4	0.57	30.5	0.05	191.1
7	0.52	40.9	0.51	40.6	0.06	193.2
8	0.53	38.1	0.53	38.0	0.04	179.9
9	0.40	43.4	0.46	28.5	0.09	189.4
10	0.46	33.9	0.52	24.2	0.10	183.7
18.21.53						
1	0.26	44.2	0.26	46.7	0.05	176.7
2	0.35	42.0	0.45	36.9	0.10	84.3
3	0.30	33.8	0.38	25.6	0.05	129.6
4	0.32	41.9	0.34	35.8	0.06	194.3
5	0.37	26.4	0.41	24.4	0.06	126.6
6	0.23	47.3	0.26	39.8	0.03	181.3
7	0.61	29.0	0.63	27.1	0.05	122.8
8	0.37	26.0	0.42	23.7	0.04	129.0
9	0.50	35.7	0.53	31.7	0.02	226.8
10	0.52	29.3	0.57	27.4	0.07	106.6
18.22.27						
1	0.87	15.0	0.86	12.9	0.05	128.7
2	0.74	13.9	0.79	11.1	0.03	127.8
3	0.82	7.5	0.83	8.8	0.05	155.7
4	0.90	9.3	0.92	10.5	0.04	170.2
5	0.71	9.1	0.70	10.6	0.04	149.1
6	0.84	8.9	0.83	9.9	0.03	148.3
7	0.55	13.4	0.51	16.1	0.02	150.7
8	0.67	4.0	0.62	8.7	0.05	148.8
9	0.27	24.7	0.42	17.8	0.09	117.7
10	0.20	26.2	0.28	16.1	0.06	154.4
18.22.40						
1	0.48	32.5	0.60	18.7	0.03	174.5
2	0.78	19.0	0.82	13.5	0.04	176.5
3	0.63	17.7	0.63	17.8	0.05	117.9
4	0.64	21.6	0.66	21.2	0.06	99.9
5	0.65	15.9	0.56	24.4	0.06	103.4
6	0.62	24.1	0.63	20.4	0.07	111.3
7	0.66	16.5	0.59	22.5	0.03	269.9
8	0.59	14.9	0.48	26.0	0.12	102.4
9	0.66	18.9	0.73	14.3	0.04	148.2
10	0.35	26.0	0.46	20.8	0.13	118.3
18.32.33						
1	0.82	29.1	0.89	27.5	0.11	101.5
2	0.66	32.2	0.67	31.2	0.12	104.2
3	0.66	29.6	0.78	42.9	0.28	75.4
4	0.70	24.3	0.71	27.3	0.09	104.7
5	0.51	24.2	0.49	24.1	0.09	117.8
6	0.60	20.5	0.62	18.3	0.05	128.1
7	0.45	29.4	0.53	19.8	0.03	142.4
8	0.47	21.6	0.46	20.4	0.03	128.4
9	0.63	14.0	0.59	15.4	0.06	117.5
10	0.40	19.9	0.30	30.5	0.07	109.9
18.33.26						
1	0.36	16.3	0.37	15.2	0.04	142.7
2	0.47	17.3	0.50	15.4	0.04	151.7

3	0.64	11.6	0.79	5.9	0.02	146.9
4	0.62	29.2	0.75	13.5	0.06	166.6
5	0.55	22.9	0.74	10.8	0.02	198.9
6	0.73	32.6	0.86	12.1	0.04	629.3
7	0.51	30.9	0.55	23.5	0.03	647.3
8	0.56	35.1	0.61	28.5	0.04	150.2
9	0.73	29.9	0.91	12.0	0.07	167.9
10	0.48	26.4	0.62	14.0	0.02	111.4
18.33.36						
1	0.75	14.4	0.79	11.3	0.01	131.0
2	0.52	25.0	0.61	18.2	0.02	350.4
3	0.91	5.2	0.90	5.6	0.01	299.3
4	0.75	7.9	0.73	9.3	0.03	150.4
5	0.83	10.8	0.86	8.5	0.01	147.4
6	0.84	5.3	0.87	4.1	0.01	210.7
7	0.49	20.4	0.52	17.8	0.03	235.5
8	0.77	6.0	0.81	4.7	0.02	235.4
9	0.37	22.0	0.39	19.7	0.04	138.6
10	0.42	22.3	0.45	19.0	0.04	121.9
18.33.43						
1	0.91	22.9	0.97	24.5	0.11	69.5
2	0.78	32.2	0.78	32.4	0.02	178.0
3	0.60	36.9	0.76	43.6	0.23	82.6
4	0.90	25.0	0.97	9.0	0.01	231.1
5	0.63	24.0	0.78	12.0	0.02	117.5
6	0.89	27.8	0.98	16.8	0.06	69.6
7	0.78	36.6	0.90	12.3	0.01	217.1
8	0.68	22.0	0.82	10.3	0.02	129.1
9	0.85	15.5	0.92	7.7	0.01	205.4
10	0.65	21.7	0.78	10.2	0.03	125.4
18.33.50						
1	0.74	36.6	0.78	31.2	0.05	181.7
2	0.45	32.8	0.52	26.7	0.05	100.5
3	0.64	30.4	0.70	36.8	0.12	83.2
4	0.55	32.6	0.57	40.4	0.11	100.1
5	0.50	32.1	0.49	38.4	0.08	105.7
6	0.71	53.2	1.29	41.1	0.04	195.1
7	0.56	23.0	0.50	28.4	0.05	271.2
8	0.35	156.6	0.45	68.2	0.06	220.3
9	0.55	43.2	0.50	54.9	0.06	269.4
10	0.37	38.7	0.29	54.7	0.04	199.7
18.35.42						
1	0.14	545.8	0.07	99.6	0.14	546.8
2	0.07	597.0	0.09	22.8	0.07	595.6
3	0.14	624.8	0.08	74.1	0.14	620.8
4	0.05	556.2	0.08	18.8	0.05	618.4
5	0.29	212.8	0.05	50.3	0.29	212.2
6	0.07	204.8	0.13	31.2	0.07	192.6
7	0.19	220.1	0.18	9.0	0.15	218.5
8	0.08	205.9	0.63	5.5	0.08	316.4
9	0.15	29.8	0.15	28.4	0.03	231.9
10	0.06	25.5	0.06	30.5	0.07	258.7
18.47.43						
1	0.06	128.2	0.06	128.8	0.03	797.2
2	0.04	128.2	0.04	128.3	0.02	786.3
3	0.07	124.9	0.12	53.1	0.10	818.8
4	0.04	118.4	0.04	118.8	0.02	800.2

5	0.08	88.9	0.08	43.8	0.09	803.7
6	0.04	131.1	0.05	61.1	0.03	790.4
7	0.03	202.3	0.03	202.9	0.02	800.6
8	0.08	55.3	0.08	55.4	0.05	798.9
9	0.05	128.9	0.06	134.5	0.03	806.3
10	0.06	170.3	0.06	169.2	0.07	806.8
18.57.25						
1	0.15	43.5	0.14	46.5	0.04	179.2
2	0.33	21.0	0.33	21.4	0.04	171.9
3	0.21	21.6	0.21	21.9	0.05	173.3
4	0.24	28.5	0.24	29.1	0.04	170.6
5	0.39	18.9	0.39	19.3	0.04	151.0
6	0.29	27.2	0.29	27.8	0.04	171.1
7	0.46	22.0	0.46	21.9	0.03	182.2
8	0.39	22.4	0.39	21.8	0.03	196.9
9	0.30	30.9	0.30	31.9	0.04	156.3
10	0.45	20.9	0.44	20.9	0.04	174.7

9.5 Flight 13 (LHCP)

	2-Ray Model		3-Ray Model			
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
16.12.57						
1	0.97	74.9	0.96	74.7	0.05	250.1
2	0.71	6.3	1.48	5.8	0.07	181.8
3	0.08	19.6	0.09	19.2	0.03	240.3
4	0.43	36.4	0.43	37.8	0.04	223.7
5	0.15	42.5	0.15	41.6	0.03	163.9
6	0.18	43.8	0.17	41.7	0.08	154.8
7	0.32	4.8	0.34	4.3	0.03	242.3
8	0.44	28.2	0.11	52.5	0.04	245.2
9	0.10	56.0	0.10	54.3	0.05	213.9
10	0.47	26.0	0.48	26.4	0.05	173.8
16.13.06						
1	0.94	28.4	0.97	28.9	0.04	251.1
2	0.37	29.6	0.38	29.3	0.02	247.9
3	0.31	34.1	0.32	31.5	0.04	197.9
4	0.32	31.3	0.13	149.1	0.02	335.8
5	0.13	49.8	0.13	50.9	0.04	159.2
6	0.33	22.0	0.40	17.5	0.07	151.7
7	0.68	13.7	0.77	12.0	0.04	236.2
8	0.32	35.1	0.57	14.9	0.02	211.0
9	0.99	26.7	1.00	27.6	0.04	201.2
10	0.36	27.3	0.33	30.8	0.10	199.2
16.13.16						
1	0.95	19.4	0.96	19.7	0.03	136.2
2	0.32	20.0	0.32	19.9	0.02	252.1
3	0.53	20.8	0.59	16.2	0.08	127.3
4	0.16	194.1	0.13	25.9	0.16	193.1
5	0.23	22.2	0.23	22.9	0.04	222.4
6	0.94	13.8	0.96	14.8	0.03	145.9
7	0.62	35.8	0.84	18.2	0.02	217.0
8	0.33	25.8	0.33	28.2	0.05	216.0
9	0.48	30.9	0.48	32.6	0.05	208.9
10	0.15	30.6	0.16	28.6	0.04	237.4
16.13.22						
1	0.95	20.5	0.95	20.4	0.04	107.3
2	0.39	24.6	0.39	26.4	0.08	154.8
3	0.43	11.1	0.41	12.0	0.02	230.0
4	0.67	23.9	0.67	23.9	0.07	139.6
5	0.14	54.5	0.13	55.1	0.04	234.0
6	0.39	15.4	0.53	10.4	0.07	169.2
7	0.69	27.2	0.67	26.6	0.09	160.2
8	0.08	104.3	0.08	104.8	0.01	246.3
9	0.71	24.3	0.70	25.0	0.04	249.1
10	0.51	24.6	0.16	38.6	0.03	244.2
16.13.32						
1	0.91	40.1	0.97	17.7	0.09	135.9
2	0.63	42.6	0.59	39.5	0.10	143.8
3	0.75	33.2	0.76	33.7	0.08	210.2
4	0.52	26.3	0.32	28.9	0.09	179.9
5	0.31	30.0	0.50	16.1	0.08	101.5

6	0.27	41.8	0.27	42.4	0.04	242.7
7	0.17	31.5	0.17	31.4	0.02	246.0
8	0.17	31.4	0.17	32.6	0.04	194.6
9	0.06	61.8	0.06	61.3	0.02	247.4
10	0.31	33.2	0.31	33.6	0.04	256.5
16.13.40						
1	0.94	20.4	0.96	21.1	0.04	234.5
2	0.72	25.1	0.72	24.5	0.04	183.8
3	0.71	19.3	0.37	25.3	0.03	198.5
4	0.05	89.6	0.07	35.1	0.05	159.8
5	0.44	20.7	0.44	16.2	0.06	143.1
6	0.32	8.4	0.28	8.6	0.03	145.8
7	0.33	18.2	0.35	17.6	0.04	240.1
8	0.30	13.6	0.36	11.9	0.04	163.4
9	0.26	31.7	0.26	31.7	0.01	239.5
10	0.08	112.4	0.19	24.9	0.07	138.7
16.13.51						
1	0.97	16.5	0.97	16.7	0.01	244.1
2	0.68	19.1	0.68	19.1	0.03	162.7
3	0.63	14.2	0.54	14.8	0.05	117.9
4	0.57	18.4	0.57	18.7	0.10	135.5
5	0.28	34.2	0.27	33.1	0.06	166.1
6	0.42	32.3	0.42	32.1	0.05	185.3
7	0.19	34.9	0.37	0.9	0.13	74.1
8	0.30	24.9	0.22	36.4	0.04	180.5
9	0.22	26.7	0.22	24.5	0.05	150.2
10	0.22	40.5	0.21	37.5	0.05	142.2
16.14.05						
1	0.91	15.8	0.90	15.7	0.04	200.3
2	0.12	125.7	0.12	121.4	0.04	259.6
3	0.18	88.1	0.12	84.2	0.05	277.2
4	0.24	123.7	0.43	33.5	0.21	87.6
5	0.17	121.3	0.35	23.4	0.08	113.8
6	0.78	16.4	0.62	29.1	0.11	104.8
7	0.50	22.1	0.60	15.3	0.02	258.0
8	0.76	18.1	0.79	15.7	0.02	92.5
9	0.18	123.5	0.49	10.8	0.07	134.4
10	0.26	42.4	0.36	20.2	0.05	176.4
16.14.15						
1	0.93	32.5	0.92	32.2	0.03	220.9
2	0.50	14.0	0.31	29.9	0.06	153.0
3	0.55	12.8	0.50	15.3	0.05	192.8
4	0.97	11.2	0.77	10.0	0.08	153.0
5	0.48	29.3	0.30	32.7	0.09	124.9
6	0.71	31.6	0.84	29.0	0.10	178.4
7	0.39	29.8	0.48	26.0	0.06	171.1
8	0.61	22.6	0.59	19.3	0.11	147.6
9	0.51	17.6	0.56	15.1	0.03	165.3
10	0.65	23.7	0.64	22.2	0.06	154.4
16.14.34						
1	0.98	13.1	0.97	12.6	0.03	176.2
2	0.84	6.8	0.86	4.6	0.06	122.9
3	0.85	6.7	0.90	5.2	0.03	253.1
4	0.32	13.2	0.25	13.5	0.05	232.0
5	0.06	94.5	0.07	12.6	0.03	238.1
6	0.11	38.3	0.11	38.6	0.04	246.5
7	0.08	122.4	0.15	37.3	0.02	286.8

8	0.11	135.0	0.13	42.2	0.08	122.1
9	0.49	15.9	0.43	17.9	0.05	123.1
10	0.91	11.1	0.91	11.0	0.03	212.9
16.14.44						
1	0.96	10.7	0.96	10.8	0.02	170.5
2	0.23	24.0	0.52	10.1	0.04	219.3
3	0.98	6.6	0.98	3.8	0.07	127.7
4	0.66	10.8	0.69	8.6	0.07	143.1
5	0.15	43.1	0.10	133.5	0.04	248.8
6	0.37	25.5	0.28	35.0	0.09	170.4
7	0.07	127.9	0.07	125.8	0.02	180.8
8	0.25	26.8	0.08	37.1	0.08	159.5
9	0.10	146.3	0.04	81.4	0.10	145.0
10	0.09	106.0	0.09	107.9	0.04	180.7
16.14.55						
1	0.89	18.1	0.88	17.5	0.05	201.1
2	0.64	12.0	0.64	10.5	0.06	185.9
3	0.11	147.9	0.61	0.3	0.08	237.6
4	0.06	150.1	0.27	31.2	0.07	166.0
5	0.05	234.7	0.17	24.7	0.05	242.6
6	0.36	21.0	0.35	20.3	0.05	116.5
7	0.07	125.8	0.09	17.6	0.05	130.2
8	0.31	26.8	0.52	20.7	0.02	250.7
9	0.82	9.4	0.78	10.9	0.03	264.6
10	0.73	25.1	0.76	23.9	0.03	171.9
16.15.08						
1	0.96	6.8	0.97	9.9	0.06	158.5
2	0.89	12.1	0.89	12.0	0.01	210.8
3	0.37	127.4	0.57	9.0	0.17	135.1
4	0.48	37.4	0.48	38.2	0.05	200.0
5	0.28	26.1	0.29	26.7	0.06	188.7
6	0.26	49.7	0.47	22.6	0.11	192.7
7	0.31	32.5	0.31	32.4	0.03	248.5
8	0.46	23.8	0.29	29.2	0.08	104.3
9	0.30	22.8	0.22	35.8	0.05	132.9
10	0.26	27.0	0.26	27.3	0.03	229.0
16.15.24						
1	0.96	11.0	0.97	11.5	0.03	110.0
2	0.77	11.2	0.77	11.5	0.05	142.2
3	0.91	9.6	0.98	9.3	0.03	256.7
4	0.73	14.8	0.71	15.2	0.02	233.2
5	0.13	31.3	0.07	43.6	0.05	161.4
6	0.35	26.0	0.26	27.3	0.06	169.0
7	0.09	32.9	0.17	22.3	0.05	169.9
8	0.07	152.5	0.69	1.2	0.08	157.0
9	0.07	82.3	0.06	51.6	0.03	161.4
10	0.10	57.4	0.17	23.7	0.03	177.2
16.15.32						
1	0.91	7.4	0.93	8.0	0.08	167.6
2	0.19	77.1	0.71	0.5	0.03	174.8
3	0.97	10.6	0.97	10.6	0.03	234.4
4	0.86	11.0	0.84	11.8	0.04	123.0
5	0.49	36.5	0.97	8.2	0.04	190.9
6	0.59	24.7	0.73	9.3	0.02	234.3
7	0.46	20.7	0.69	6.6	0.03	233.2
8	0.62	22.3	0.85	9.0	0.02	232.4
9	0.34	31.0	0.35	28.8	0.04	217.5

10	0.52	17.9	0.53	16.7	0.05	157.9
16.15.55						
1	0.97	16.5	0.97	16.6	0.02	291.5
2	0.90	16.1	0.89	15.8	0.03	156.1
3	0.50	15.0	0.51	15.8	0.03	144.2
4	0.84	15.3	0.70	7.5	0.18	49.4
5	0.66	15.0	0.68	15.2	0.14	172.9
6	0.71	4.7	0.56	7.8	0.08	165.9
7	0.74	16.8	0.75	16.9	0.03	244.7
8	0.94	1.9	0.26	28.2	0.17	67.4
9	0.89	8.1	0.89	7.9	0.03	245.8
10	0.51	23.2	0.80	3.3	0.05	144.6
16.16.21						
1	0.95	10.8	0.95	10.8	0.02	225.6
2	0.42	25.8	0.74	8.2	0.05	165.5
3	0.84	13.9	0.79	14.8	0.02	217.0
4	0.49	31.9	0.48	33.0	0.03	217.9
5	0.47	31.7	0.47	31.8	0.03	259.8
6	0.61	27.0	0.67	23.9	0.04	161.4
7	0.11	55.8	0.29	16.8	0.03	92.4
8	0.28	27.1	0.41	16.7	0.08	171.2
9	0.21	28.1	0.21	26.7	0.04	139.8
10	0.03	126.3	0.19	11.1	0.02	250.6
16.16.28						
1	0.59	55.4	0.58	51.7	0.06	225.6
2	0.21	36.3	0.27	32.2	0.04	241.0
3	0.44	24.3	0.62	15.7	0.10	162.9
4	0.25	31.7	0.33	25.0	0.09	173.0
5	0.21	40.8	0.46	28.0	0.05	191.1
6	0.08	108.9	0.34	16.3	0.13	56.6
7	0.70	11.1	0.24	34.3	0.08	154.3
8	0.45	27.3	0.48	25.1	0.04	154.0
9	0.17	36.2	0.28	19.1	0.07	73.6
10	0.31	24.8	0.30	22.2	0.04	159.9
16.16.41						
1	0.89	9.8	0.92	10.6	0.10	116.7
2	0.28	46.2	0.27	61.7	0.18	111.0
3	0.50	22.2	0.50	23.9	0.05	124.3
4	0.56	33.3	0.57	32.8	0.03	200.2
5	0.15	24.3	0.15	23.9	0.03	246.2
6	0.39	21.5	0.50	14.2	0.03	180.5
7	0.55	10.1	0.36	17.4	0.05	136.3
8	0.26	15.8	0.35	9.5	0.05	158.5
9	0.45	16.7	0.38	16.7	0.08	157.4
10	0.49	12.4	0.25	18.8	0.04	162.4
16.16.50						
1	0.97	8.7	0.98	8.7	0.03	107.4
2	0.96	5.6	0.92	6.9	0.03	177.5
3	0.30	22.6	0.24	29.0	0.04	243.0
4	0.43	22.6	0.16	31.4	0.05	172.6
5	0.26	23.2	0.24	26.3	0.02	242.1
6	0.08	27.2	0.08	24.3	0.04	170.6
7	0.26	8.5	0.36	3.9	0.04	159.9
8	0.36	20.3	0.04	45.7	0.07	157.9
9	0.07	31.6	0.07	27.2	0.04	167.8
10	0.22	34.8	0.22	32.9	0.04	167.2
16.16.57						

1	0.96	11.3	0.97	11.5	0.02	201.2
2	0.23	18.6	0.23	19.0	0.03	231.8
3	0.86	10.2	0.86	10.1	0.03	190.7
4	0.87	11.9	0.83	17.7	0.02	251.5
5	0.48	23.2	0.51	21.2	0.04	197.5
6	0.46	28.3	0.63	14.5	0.04	186.9
7	0.54	25.6	0.58	22.9	0.03	188.1
8	0.51	24.1	0.58	16.7	0.01	233.1
9	0.22	39.6	0.35	27.9	0.02	245.8
10	0.14	33.2	0.34	16.1	0.07	175.1
16.17.06						
1	0.91	10.2	0.92	10.4	0.04	145.7
2	0.30	20.0	0.29	17.9	0.06	145.9
3	0.76	16.2	0.77	16.6	0.03	111.7
4	0.46	23.1	0.59	14.6	0.03	186.3
5	0.58	18.2	0.58	18.2	0.02	233.9
6	0.73	16.9	0.76	16.1	0.02	235.8
7	0.29	22.6	0.62	10.0	0.02	170.1
8	0.57	16.3	0.51	19.0	0.05	148.5
9	0.45	17.8	0.25	29.2	0.06	150.2
10	0.34	10.5	0.18	25.6	0.03	179.4
16.17.23						
1	0.88	30.3	0.88	25.6	0.07	154.0
2	0.29	25.5	0.27	26.6	0.06	159.8
3	0.47	25.2	0.43	29.4	0.04	148.3
4	0.62	36.7	0.62	35.6	0.03	201.9
5	0.15	85.7	0.28	21.8	0.07	151.2
6	0.15	34.2	0.42	13.0	0.03	157.3
7	0.11	150.9	0.04	38.2	0.10	152.3
8	0.09	118.9	0.23	20.5	0.06	155.4
9	0.18	42.0	0.24	28.8	0.09	158.6
10	0.16	27.8	0.24	22.4	0.05	175.3
16.17.44						
1	0.95	15.2	0.95	15.2	0.02	160.4
2	0.19	24.9	0.18	21.3	0.08	151.5
3	0.31	18.0	0.25	23.9	0.08	144.7
4	0.32	35.1	0.35	27.3	0.09	149.7
5	0.16	26.9	0.20	16.9	0.07	157.0
6	0.17	25.8	0.24	21.5	0.06	164.3
7	0.17	12.0	0.13	13.2	0.05	163.3
8	0.11	13.2	0.04	31.1	0.04	171.2
9	0.20	17.5	0.12	25.5	0.05	183.2
10	0.04	25.1	0.04	30.8	0.04	164.6
16.17.55						
1	0.92	10.9	0.90	10.0	0.04	124.5
2	0.50	17.3	0.50	17.2	0.05	241.6
3	0.69	10.9	0.70	8.5	0.07	135.8
4	0.34	16.9	0.35	15.6	0.06	189.0
5	0.33	23.5	0.33	24.2	0.08	163.4
6	0.47	13.0	0.41	16.8	0.05	173.7
7	0.17	50.7	0.17	46.5	0.07	155.5
8	0.28	36.7	0.45	13.8	0.02	190.3
9	0.25	20.0	0.19	30.5	0.04	152.7
10	0.15	41.1	0.23	29.6	0.07	176.8
16.18.03						
1	0.29	142.1	0.86	0.6	0.15	142.7
2	0.20	49.0	0.39	16.0	0.10	129.2

3	0.22	36.5	0.58	7.5	0.03	148.5
4	0.30	34.6	0.40	18.3	0.07	156.9
5	0.13	38.5	0.24	25.3	0.14	63.3
6	0.08	159.6	0.61	3.7	0.06	155.9
7	0.07	36.4	0.12	17.4	0.05	174.3
8	0.14	28.2	0.37	7.5	0.05	169.1
9	0.04	81.8	0.04	17.0	0.05	163.8
10	0.06	43.0	0.11	24.3	0.06	168.2
16.18.29						
1	0.54	14.2	0.54	13.5	0.07	256.2
2	0.33	26.3	0.52	12.7	0.16	173.7
3	0.71	14.0	0.79	12.2	0.13	96.2
4	0.85	17.8	0.86	18.1	0.05	232.8
5	0.72	15.6	0.71	14.6	0.05	136.0
6	0.74	14.2	0.77	16.1	0.14	147.7
7	0.65	24.3	0.63	23.6	0.10	139.2
8	0.61	24.4	0.61	24.5	0.03	209.6
9	0.25	112.6	0.47	26.4	0.22	75.9
10	0.39	26.9	0.35	39.9	0.18	149.5
16.18.35						
1	0.57	19.9	0.69	13.6	0.12	113.3
2	0.56	20.5	0.56	20.5	0.01	199.8
3	0.75	15.6	0.83	16.5	0.07	198.0
4	0.22	151.4	0.42	17.3	0.13	138.8
5	0.20	156.4	0.19	29.9	0.09	185.1
6	0.13	158.2	0.11	42.6	0.12	152.1
7	0.21	160.5	0.13	44.4	0.17	155.5
8	0.15	159.8	0.14	41.7	0.12	154.7
9	0.12	104.1	0.21	31.9	0.08	151.5
10	0.13	157.2	0.18	35.7	0.10	146.3
16.18.41						
1	0.74	9.4	0.70	12.7	0.11	86.1
2	0.46	25.2	0.64	11.7	0.03	185.3
3	0.17	45.9	0.05	80.5	0.04	170.0
4	0.12	46.7	0.29	25.2	0.09	174.0
5	0.11	98.7	0.17	25.8	0.03	259.5
6	0.08	56.4	0.06	32.1	0.04	166.5
7	0.15	39.0	0.11	69.8	0.04	123.3
8	0.21	25.5	0.15	41.3	0.03	180.7
9	0.03	84.8	0.05	111.9	0.07	143.5
10	0.21	19.7	0.25	16.7	0.05	171.0
16.18.48						
1	0.59	30.4	0.58	18.9	0.26	117.6
2	0.21	41.7	0.23	33.1	0.11	150.4
3	0.05	95.9	0.14	21.0	0.08	158.1
4	0.04	105.6	0.05	41.0	0.06	168.1
5	0.03	94.7	0.04	75.4	0.04	162.6
6	0.06	51.3	0.17	15.8	0.05	161.1
7	0.09	94.9	0.28	10.8	0.04	158.7
8	0.46	26.0	0.72	9.4	0.07	106.7
9	0.53	18.7	0.82	17.8	0.25	88.5
10	0.16	41.6	0.22	25.2	0.07	149.1
16.18.57						
1	0.97	9.0	0.99	8.9	0.03	118.1
2	0.63	10.2	0.81	10.6	0.14	94.8
3	0.48	16.8	0.55	12.6	0.05	92.5
4	0.68	11.5	0.68	12.4	0.03	51.2

5	0.35	18.1	0.26	32.0	0.06	155.1
6	0.37	19.2	0.36	18.3	0.06	154.0
7	0.32	20.5	0.66	14.1	0.10	167.7
8	0.27	11.8	0.28	14.2	0.05	168.6
9	0.23	21.2	0.33	16.6	0.06	170.3
10	0.03	36.9	0.36	14.4	0.07	177.6
16.19.04						
1	0.98	8.8	0.96	8.4	0.02	119.4
2	0.28	23.6	0.46	10.6	0.03	149.8
3	0.24	16.2	0.21	23.2	0.02	245.8
4	0.22	14.7	0.23	12.3	0.04	166.5
5	0.06	46.2	0.12	29.9	0.04	180.6
6	0.05	47.5	0.08	32.8	0.04	183.7
7	0.05	98.9	0.10	29.3	0.06	174.8
8	0.06	53.2	0.18	22.2	0.05	164.0
9	0.03	98.0	0.07	33.0	0.04	172.1
10	0.02	82.7	0.06	23.6	0.04	178.1
16.19.18						
1	0.91	19.3	0.87	18.2	0.07	125.4
2	0.71	20.0	0.61	18.2	0.07	154.3
3	0.28	30.8	0.42	15.8	0.08	141.9
4	0.47	20.2	0.50	18.0	0.07	158.6
5	0.10	36.6	0.19	17.0	0.07	150.7
6	0.38	19.1	0.45	14.5	0.04	158.0
7	0.24	26.6	0.18	41.2	0.09	152.8
8	0.09	23.7	0.15	24.3	0.06	173.9
9	0.06	96.0	0.08	35.5	0.05	169.1
10	0.05	99.6	0.04	90.9	0.06	164.3
16.19.30						
1	0.51	41.8	0.72	13.1	0.06	241.4
2	0.28	31.5	0.29	29.8	0.04	209.1
3	0.52	20.6	0.52	20.5	0.06	171.4
4	0.14	35.9	0.15	34.7	0.03	177.8
5	0.14	54.4	0.13	54.8	0.07	195.4
6	0.10	35.8	0.11	44.3	0.10	161.7
7	0.18	35.8	0.19	32.5	0.03	176.9
8	0.28	32.0	0.32	27.0	0.04	242.3
9	0.21	37.0	0.24	31.4	0.06	140.0
10	0.25	60.1	0.24	38.4	0.09	103.3
16.19.43						
1	0.94	13.7	0.92	18.4	0.01	226.7
2	0.38	17.3	0.40	16.6	0.02	253.7
3	0.37	51.2	0.38	49.3	0.04	200.7
4	0.52	11.3	0.46	13.3	0.07	112.8
5	0.52	9.3	0.29	25.7	0.07	199.1
6	0.30	20.7	0.30	28.9	0.03	203.3
7	0.22	24.0	0.24	28.8	0.06	206.5
8	0.31	12.9	0.31	19.4	0.03	202.5
9	0.31	21.5	0.25	17.1	0.06	202.8
10	0.05	56.0	0.18	21.0	0.06	167.4
16.19.50						
1	0.71	20.0	0.81	14.1	0.11	130.6
2	0.20	48.9	0.18	46.9	0.07	165.1
3	0.71	15.5	0.73	16.7	0.06	126.9
4	0.59	17.2	0.59	17.9	0.04	146.5
5	0.09	29.9	0.21	16.1	0.04	172.1
6	0.33	38.8	0.43	27.2	0.04	176.8

7	0.23	31.5	0.40	15.3	0.05	143.7
8	0.16	39.1	0.26	18.5	0.04	136.3
9	0.32	36.2	0.33	33.6	0.03	170.7
10	0.22	31.0	0.30	24.1	0.06	167.8
16.29.46						
1	0.73	31.9	0.85	16.5	0.01	247.6
2	0.10	43.4	0.10	48.0	0.05	173.7
3	0.42	37.0	0.42	36.9	0.03	247.5
4	0.41	38.4	0.42	38.4	0.04	171.0
5	0.08	65.2	0.08	64.6	0.04	177.6
6	0.77	35.8	0.79	29.6	0.02	220.4
7	0.14	74.9	0.15	49.0	0.04	169.8
8	0.38	49.3	0.38	49.7	0.04	174.9
9	0.51	41.9	0.51	41.9	0.02	250.7
10	0.14	56.9	0.14	68.0	0.03	187.8
16.30.33						
1	0.71	35.7	0.70	35.5	0.03	150.0
2	0.22	54.1	0.22	54.9	0.04	179.2
3	0.23	44.6	0.23	45.9	0.05	182.9
4	0.66	39.0	0.65	38.7	0.04	147.0
5	0.20	30.7	0.19	34.6	0.04	179.8
6	0.58	32.7	0.58	32.8	0.03	178.0
7	0.32	33.7	0.32	35.9	0.05	157.6
8	0.29	27.0	0.29	28.2	0.04	179.2
9	0.59	42.4	0.67	28.7	0.04	151.7
10	0.26	24.3	0.25	25.4	0.02	245.6
16.32.41						
1	0.81	33.6	0.82	34.2	0.03	123.5
2	0.20	43.7	0.20	43.8	0.03	245.9
3	0.56	39.0	0.56	39.0	0.04	154.2
4	0.61	27.4	0.61	27.3	0.04	141.0
5	0.25	32.8	0.24	35.1	0.04	177.7
6	0.84	30.7	0.84	30.6	0.02	140.7
7	0.30	34.7	0.30	35.1	0.05	183.8
8	0.43	37.3	0.47	29.7	0.04	172.3
9	0.58	35.2	0.58	35.0	0.04	176.4
10	0.88	15.6	0.74	6.8	0.04	169.7
16.32.48						
1	0.75	26.8	0.76	27.2	0.03	140.2
2	0.17	59.3	0.17	60.5	0.04	182.4
3	0.53	27.3	0.53	26.9	0.02	113.6
4	0.51	34.7	0.51	34.7	0.01	188.7
5	0.26	26.9	0.26	27.6	0.04	188.0
6	0.61	22.4	0.56	28.5	0.05	179.6
7	0.52	16.3	0.61	13.3	0.05	169.2
8	0.57	10.8	0.86	7.5	0.03	261.9
9	0.44	23.0	0.41	23.5	0.05	171.6
10	0.37	13.2	0.32	12.0	0.05	171.9
16.34.47						
1	0.48	28.0	0.48	28.1	0.05	162.1
2	0.49	29.4	0.49	28.8	0.04	247.7
3	0.38	28.7	0.38	28.8	0.03	155.3
4	0.63	20.7	0.63	20.6	0.04	160.0
5	0.50	26.4	0.50	26.4	0.03	163.4
6	0.57	22.5	0.57	22.4	0.05	161.4
7	0.63	20.3	0.63	20.0	0.03	147.4
8	0.45	23.4	0.45	23.4	0.02	168.0

9	0.80	17.2	0.81	17.4	0.04	154.4
10	0.72	20.0	0.75	16.8	0.01	250.4
16.34.54						
1	0.76	19.5	0.76	20.0	0.03	179.6
2	0.67	20.4	0.67	20.6	0.02	153.0
3	0.44	20.1	0.44	20.2	0.03	172.9
4	0.89	17.3	0.89	17.5	0.02	143.8
5	0.43	22.0	0.43	22.0	0.02	177.1
6	0.77	17.6	0.78	17.6	0.01	167.6
7	0.80	17.2	0.80	17.3	0.02	172.4
8	0.41	18.3	0.42	17.6	0.02	190.7
9	0.74	16.9	0.70	20.2	0.04	171.4
10	0.29	30.1	0.28	31.3	0.03	174.9
16.36.21						
1	0.17	51.6	0.17	51.2	0.03	202.8
2	0.09	36.3	0.20	20.4	0.04	165.5
3	0.26	33.7	0.54	13.5	0.03	169.4
4	0.17	30.5	0.27	20.3	0.03	167.0
5	0.22	20.5	0.31	14.4	0.03	174.3
6	0.16	53.4	0.43	15.5	0.03	167.5
7	0.14	32.9	0.28	16.3	0.03	170.8
8	0.44	15.0	0.54	11.0	0.02	170.2
9	0.24	27.3	0.38	15.7	0.03	172.9
10	0.39	11.4	0.41	9.5	0.04	168.0
17.15.50						
1	0.24	31.3	0.24	31.8	0.06	176.6
2	0.22	24.2	0.22	24.6	0.04	172.8
3	0.28	21.8	0.27	21.8	0.04	179.6
4	0.14	31.9	0.14	33.4	0.06	173.9
5	0.18	37.4	0.18	39.0	0.07	176.1
6	0.15	33.8	0.15	34.8	0.05	177.5
7	0.08	28.8	0.07	33.0	0.05	171.2
8	0.15	32.7	0.15	34.5	0.05	173.3
9	0.18	26.1	0.08	52.7	0.06	178.3
10	0.17	32.2	0.09	60.5	0.08	181.8
18.14.24						
1	0.96	24.4	0.95	24.2	0.02	225.1
2	0.53	19.9	0.53	20.0	0.03	183.5
3	0.43	23.1	0.42	24.3	0.03	159.6
4	0.98	13.1	0.61	19.5	0.01	368.3
5	0.95	6.8	0.22	35.7	0.02	198.6
6	0.67	13.3	0.60	11.4	0.01	247.4
7	0.34	14.0	0.24	22.4	0.01	224.1
8	0.15	27.5	0.04	103.8	0.01	220.9
9	0.04	115.1	0.35	3.2	0.04	160.2
10	0.12	27.3	0.03	19.3	0.04	163.5

9.6 Flight 13 (RHCP)

time	2-Ray Model $\lvert\Gamma\rvert$	2-Ray Model τ(ns)	3-Ray Model $\lvert\Gamma_1\rvert$	3-Ray Model τ_1(ns)	3-Ray Model $\lvert\Gamma_2\rvert$	3-Ray Model τ_2(ns)
16.12.57						
1	0.52	71.9	0.53	72.4	0.05	206.2
2	0.36	16.2	0.50	11.9	0.07	158.0
3	0.08	153.4	0.07	72.0	0.02	243.6
4	0.36	15.6	0.85	6.8	0.05	182.9
5	0.18	36.8	0.18	36.5	0.04	166.5
6	0.15	68.1	0.14	64.9	0.05	177.0
7	0.56	18.6	0.19	27.1	0.04	254.1
8	0.51	20.9	0.14	30.2	0.04	172.2
9	0.15	51.9	0.15	51.3	0.03	191.5
10	0.46	29.4	0.12	53.3	0.06	179.2
16.13.06						
1	0.82	31.4	0.87	32.7	0.14	110.3
2	0.78	10.1	0.78	10.1	0.05	273.3
3	0.43	17.6	0.42	17.5	0.03	247.9
4	0.22	26.1	0.40	30.4	0.20	75.1
5	0.16	61.3	0.16	59.5	0.04	181.2
6	0.33	28.3	0.33	24.8	0.07	155.9
7	0.49	42.8	0.61	56.8	0.23	98.4
8	0.29	29.7	0.46	43.0	0.23	65.8
9	0.81	25.7	0.85	18.7	0.09	228.3
10	0.36	29.5	0.34	30.3	0.06	186.4
16.13.16						
1	0.74	20.9	0.73	26.4	0.12	140.0
2	0.30	10.9	0.18	41.6	0.15	87.2
3	0.16	16.0	0.16	16.9	0.04	165.0
4	0.49	16.4	0.49	16.4	0.04	168.5
5	0.18	105.4	0.12	50.4	0.17	120.1
6	0.78	16.5	0.81	17.5	0.08	108.8
7	0.77	23.0	0.96	22.5	0.05	169.9
8	0.16	115.6	0.42	9.1	0.11	105.5
9	0.68	21.8	0.43	17.2	0.12	159.7
10	0.10	38.9	0.26	19.2	0.06	170.5
16.13.22						
1	0.62	24.7	0.63	25.1	0.05	137.2
2	0.26	23.0	0.26	22.2	0.08	181.8
3	0.13	34.0	0.13	34.3	0.04	229.2
4	0.53	32.7	0.57	25.5	0.07	123.9
5	0.13	93.6	0.14	94.1	0.02	212.4
6	0.18	61.0	0.23	25.2	0.04	235.7
7	0.62	25.5	0.61	24.6	0.07	145.7
8	0.07	85.8	0.06	87.9	0.05	166.8
9	0.56	22.0	0.50	26.5	0.06	159.8
10	0.09	88.7	0.63	11.0	0.25	43.6
16.13.32						
1	0.77	28.3	0.77	25.8	0.11	147.9
2	0.51	16.0	0.43	11.8	0.11	103.9
3	0.56	27.5	0.52	17.5	0.21	92.8
4	0.15	99.6	0.15	105.0	0.08	164.8
5	0.19	57.1	0.34	68.2	0.28	85.8

6	0.60	26.4	0.57	20.9	0.25	96.3
7	0.49	21.4	0.94	18.6	0.20	84.8
8	0.14	81.9	0.14	82.6	0.04	190.4
9	0.46	22.1	0.15	50.5	0.03	191.7
10	0.74	21.9	0.54	23.7	0.10	181.0
16.13.40						
1	0.73	24.0	0.58	9.3	0.20	79.9
2	0.44	33.6	0.44	35.5	0.05	170.2
3	0.27	28.6	0.26	28.8	0.03	186.2
4	0.07	92.4	0.08	93.6	0.03	249.8
5	0.33	42.5	0.36	36.8	0.04	255.3
6	0.26	28.3	0.11	45.3	0.06	245.5
7	0.24	61.3	0.24	60.8	0.03	237.8
8	0.14	47.0	0.15	39.6	0.04	250.0
9	0.13	57.0	0.13	56.8	0.04	212.3
10	0.12	40.9	0.12	39.0	0.04	248.0
16.13.51						
1	0.73	12.6	0.76	11.6	0.05	122.0
2	0.90	16.1	0.86	14.4	0.08	114.3
3	0.32	13.3	0.53	11.0	0.07	86.2
4	0.58	10.5	0.42	20.4	0.15	132.5
5	0.41	25.2	0.09	51.9	0.04	248.7
6	0.44	28.7	0.26	34.0	0.03	242.3
7	0.46	21.8	0.13	79.1	0.02	265.4
8	0.25	24.5	0.32	18.3	0.04	185.8
9	0.47	21.8	0.37	26.5	0.11	97.6
10	0.47	30.8	0.36	46.9	0.02	196.2
16.14.05						
1	0.18	39.2	0.16	51.0	0.04	232.1
2	0.17	45.7	0.15	59.9	0.05	237.5
3	0.42	26.4	0.37	30.4	0.03	265.6
4	0.51	21.4	0.46	24.4	0.02	266.8
5	0.18	30.9	0.18	30.9	0.03	272.3
6	0.14	42.5	0.14	43.1	0.03	282.1
7	0.29	43.6	0.66	9.8	0.02	170.8
8	0.31	37.0	0.65	9.7	0.02	185.4
9	0.31	36.8	0.25	52.8	0.08	178.1
10	0.31	35.2	0.63	11.8	0.04	181.6
16.14.15						
1	0.46	33.1	0.46	33.1	0.04	171.1
2	0.64	20.4	0.36	22.7	0.05	175.4
3	0.29	19.4	0.19	30.9	0.05	206.5
4	0.80	14.0	0.57	18.3	0.15	94.0
5	0.62	22.8	0.23	32.5	0.08	90.2
6	0.70	31.1	0.68	27.3	0.14	109.3
7	0.67	20.1	0.19	27.3	0.04	245.7
8	0.75	18.6	0.74	15.3	0.12	169.1
9	0.81	9.4	0.27	30.7	0.12	72.1
10	0.78	19.2	0.81	5.9	0.12	63.7
16.14.34						
1	0.24	27.3	0.17	46.8	0.05	233.7
2	0.17	42.8	0.15	58.6	0.05	237.4
3	0.39	30.3	0.34	35.0	0.03	283.0
4	0.49	22.9	0.44	26.2	0.02	267.7
5	0.18	31.3	0.17	31.3	0.03	272.3
6	0.09	62.9	0.08	65.4	0.03	282.9
7	0.42	26.1	0.40	28.2	0.04	172.9

8	0.48	19.4	0.46	20.6	0.04	171.5
9	0.31	35.9	0.27	47.4	0.08	181.6
10	0.34	29.8	0.30	37.2	0.07	184.9
16.14.44						
1	0.89	12.5	0.88	13.6	0.03	199.6
2	0.47	12.8	0.64	2.3	0.08	82.4
3	1.00	6.5	0.78	7.3	0.07	120.0
4	0.78	3.6	0.97	5.7	0.11	126.0
5	0.81	5.9	0.21	37.2	0.05	174.9
6	0.25	35.3	0.28	27.8	0.07	182.1
7	0.13	67.3	0.12	46.7	0.11	117.3
8	0.48	26.5	0.22	33.8	0.08	173.7
9	0.07	156.0	0.12	25.3	0.08	160.6
10	0.15	107.7	0.88	3.7	0.14	103.7
16.14.55						
1	0.86	17.2	0.88	17.6	0.08	131.9
2	0.53	9.0	0.47	10.9	0.06	172.2
3	0.39	9.3	0.31	13.4	0.07	158.8
4	0.09	34.3	0.08	31.7	0.07	175.0
5	0.42	23.0	0.23	27.7	0.06	103.8
6	0.46	25.8	0.42	3.3	0.10	74.4
7	0.36	26.2	0.57	23.1	0.09	178.4
8	0.80	21.1	0.70	21.8	0.10	185.1
9	0.67	23.3	0.28	34.6	0.05	182.0
10	0.59	20.9	0.65	18.4	0.04	180.9
16.15.08						
1	0.90	12.0	0.90	12.0	0.06	158.8
2	0.81	16.9	0.81	16.6	0.14	130.1
3	0.26	143.9	0.64	8.0	0.15	167.9
4	0.24	40.6	0.22	60.3	0.03	231.0
5	0.17	60.1	0.17	59.4	0.02	195.1
6	0.29	60.2	0.30	61.9	0.05	172.7
7	0.32	45.6	0.32	45.6	0.04	224.1
8	0.23	58.5	0.23	59.7	0.03	226.4
9	0.24	51.2	0.24	49.1	0.03	199.0
10	0.15	65.3	0.15	65.8	0.02	199.2
16.15.24						
1	0.90	9.8	0.92	10.1	0.05	131.6
2	1.00	5.6	0.95	4.0	0.05	186.5
3	0.93	8.4	0.36	35.8	0.21	74.9
4	0.89	9.9	0.79	10.4	0.05	173.9
5	0.34	20.9	0.45	0.7	0.10	73.1
6	0.75	24.6	0.66	0.1	0.15	61.3
7	0.42	20.4	0.11	75.2	0.05	166.3
8	0.05	163.2	0.09	77.1	0.06	151.8
9	0.52	6.4	0.16	11.9	0.05	179.2
10	0.23	27.7	0.14	29.2	0.11	92.5
16.15.32						
1	0.81	12.1	0.82	12.4	0.10	145.9
2	0.44	18.3	0.65	8.2	0.03	252.2
3	0.67	9.7	0.67	9.9	0.02	183.2
4	0.86	12.9	0.81	10.3	0.07	131.0
5	0.69	19.5	0.72	13.8	0.03	170.8
6	0.54	17.7	0.57	16.7	0.03	238.4
7	0.22	37.9	0.19	42.6	0.07	143.3
8	0.35	29.2	0.36	27.6	0.04	241.6
9	0.35	50.3	0.34	53.2	0.07	188.1

10	0.37	15.4	0.37	16.3	0.03	221.6
16.15.55						
1	0.56	21.5	0.56	21.7	0.04	163.2
2	0.72	17.1	0.72	17.1	0.02	298.9
3	0.39	29.3	0.39	29.6	0.07	126.8
4	0.84	18.4	0.86	18.6	0.11	112.0
5	0.52	14.2	0.49	16.6	0.11	162.0
6	0.17	100.9	0.21	13.2	0.05	246.6
7	0.52	16.3	0.54	15.0	0.04	193.4
8	0.15	48.2	0.15	49.1	0.03	245.1
9	0.24	40.9	0.29	29.1	0.11	143.2
10	0.60	28.6	0.12	81.7	0.03	174.0
16.16.21						
1	0.58	31.5	0.75	14.2	0.03	236.7
2	0.19	38.6	0.74	4.2	0.03	161.3
3	0.61	24.8	0.60	32.2	0.17	113.3
4	0.39	24.9	0.31	36.9	0.05	220.8
5	0.45	27.4	0.49	26.1	0.05	190.1
6	0.50	44.4	0.54	35.1	0.05	201.8
7	0.04	85.1	0.04	86.4	0.04	187.3
8	0.09	131.1	0.37	20.1	0.06	173.6
9	0.06	119.0	0.24	11.9	0.09	98.3
10	0.05	131.0	0.05	125.6	0.04	237.8
16.16.28						
1	0.49	53.8	0.42	44.7	0.24	149.5
2	0.78	14.3	0.71	15.2	0.08	192.8
3	0.28	35.0	0.28	49.7	0.13	106.8
4	0.77	19.4	0.77	17.9	0.12	182.2
5	0.67	30.0	0.62	17.3	0.23	91.1
6	0.24	40.5	0.25	26.4	0.14	72.0
7	0.30	25.8	0.49	17.4	0.15	99.6
8	0.56	14.2	0.47	16.9	0.07	178.2
9	0.34	16.5	0.53	0.9	0.09	97.5
10	0.34	28.4	0.34	26.7	0.10	107.4
16.16.41						
1	0.74	13.2	0.73	12.9	0.10	124.9
2	0.48	18.0	0.71	11.2	0.11	169.2
3	0.30	37.3	0.30	34.0	0.06	183.0
4	0.49	31.9	0.48	32.7	0.01	222.4
5	0.16	64.7	0.16	63.7	0.02	200.3
6	0.39	22.3	0.40	21.4	0.02	239.7
7	0.42	22.8	0.42	23.4	0.02	220.4
8	0.47	9.9	0.56	8.5	0.03	254.9
9	0.24	25.8	0.25	24.6	0.02	248.2
10	0.17	32.4	0.17	31.6	0.01	242.8
16.16.50						
1	0.94	7.8	0.93	8.8	0.04	120.3
2	0.93	6.1	0.92	5.2	0.03	130.3
3	0.10	96.9	0.88	4.9	0.11	48.4
4	0.15	91.5	0.33	3.5	0.09	85.8
5	0.08	108.9	0.76	4.2	0.02	164.1
6	0.08	69.7	0.90	0.5	0.05	160.6
7	0.09	103.7	0.27	7.6	0.08	79.6
8	0.08	70.7	0.92	0.3	0.05	164.7
9	0.11	74.3	0.12	37.7	0.06	178.5
10	0.21	42.5	0.21	39.5	0.03	170.2
16.16.57						

1	0.90	12.7	0.90	12.7	0.03	189.3
2	0.41	11.4	0.50	17.4	0.16	55.4
3	0.62	13.8	0.64	12.8	0.06	162.3
4	0.84	17.8	0.79	21.4	0.06	134.2
5	0.29	49.1	0.29	48.8	0.03	203.9
6	0.46	18.9	0.47	18.4	0.02	240.1
7	0.35	37.5	0.36	36.1	0.03	210.9
8	0.40	15.7	0.40	15.4	0.01	237.5
9	0.17	49.5	0.17	47.1	0.03	185.7
10	0.17	52.1	0.16	47.7	0.05	179.2
16.17.06						
1	0.51	22.4	0.55	25.8	0.17	102.1
2	0.19	31.1	0.19	31.1	0.11	176.5
3	0.68	17.3	0.53	48.3	0.13	117.9
4	0.65	11.9	0.40	33.4	0.03	240.2
5	0.56	20.7	0.56	20.1	0.03	167.4
6	0.61	25.6	0.59	27.1	0.03	196.9
7	0.44	20.7	0.43	21.2	0.01	173.1
8	0.42	31.9	0.42	32.0	0.01	204.1
9	0.31	27.4	0.30	30.5	0.05	84.7
10	0.30	25.7	0.32	23.4	0.04	187.4
16.17.23						
1	0.67	29.8	0.66	29.3	0.05	188.8
2	0.67	18.4	0.70	15.6	0.08	173.0
3	0.67	18.4	0.18	26.6	0.02	259.4
4	0.52	28.2	0.50	29.2	0.05	180.9
5	0.71	9.6	0.30	15.9	0.02	195.8
6	0.33	23.7	0.25	22.1	0.12	92.2
7	0.33	15.7	0.16	26.3	0.04	150.4
8	0.31	8.5	0.29	8.7	0.03	181.6
9	0.18	34.7	0.17	32.8	0.08	174.2
10	0.08	25.8	0.09	24.7	0.04	175.3
16.17.44						
1	0.77	15.2	0.66	25.6	0.05	290.6
2	0.13	33.7	0.13	34.2	0.03	255.4
3	0.23	16.0	0.69	11.8	0.04	248.5
4	0.50	15.6	0.45	17.0	0.05	252.1
5	0.04	101.7	0.09	104.6	0.07	180.8
6	0.22	25.5	0.21	25.1	0.06	178.6
7	0.14	14.8	0.06	98.3	0.03	251.4
8	0.08	89.5	0.08	89.8	0.04	168.5
9	0.13	28.4	0.14	27.2	0.05	178.4
10	0.16	7.6	0.18	6.3	0.02	249.6
16.17.55						
1	0.93	6.6	0.91	5.7	0.04	99.6
2	0.74	9.6	0.74	9.4	0.02	155.6
3	0.81	7.1	0.89	4.9	0.06	131.9
4	0.67	8.2	0.67	8.0	0.04	169.9
5	0.56	9.0	0.56	9.7	0.04	147.7
6	0.64	7.5	0.55	10.9	0.05	179.0
7	0.49	10.8	0.50	10.7	0.05	165.6
8	0.39	21.1	0.43	18.3	0.05	169.3
9	0.31	31.2	0.31	30.8	0.02	245.5
10	0.26	31.4	0.27	31.2	0.06	182.5
16.18.03						
1	0.81	4.4	0.81	4.3	0.02	166.5
2	0.65	5.3	0.65	6.5	0.04	145.3

3	0.78	2.0	0.88	1.7	0.05	91.8
4	0.55	5.6	0.52	6.7	0.04	169.0
5	0.11	106.1	0.47	14.0	0.12	60.2
6	0.12	94.2	0.72	1.5	0.04	84.4
7	0.10	88.7	0.57	0.5	0.04	181.4
8	0.08	99.2	0.18	21.8	0.05	177.4
9	0.12	64.6	0.17	22.9	0.06	178.9
10	0.17	17.6	0.19	17.3	0.06	178.6
16.18.29						
1	0.29	43.4	0.29	43.1	0.03	256.1
2	0.41	29.0	0.42	30.1	0.08	193.3
3	0.21	59.3	0.21	61.6	0.04	187.9
4	0.35	19.6	0.35	23.7	0.09	98.4
5	0.21	23.7	0.09	48.9	0.16	176.2
6	0.41	26.5	0.41	27.1	0.11	168.3
7	0.09	64.7	0.09	65.6	0.07	188.3
8	0.20	57.0	0.22	57.4	0.09	140.2
9	0.55	21.3	0.57	22.2	0.11	98.0
10	0.40	117.7	0.21	32.7	0.39	118.6
16.18.35						
1	0.25	130.0	0.29	29.0	0.17	120.0
2	0.37	67.2	0.53	13.3	0.19	106.1
3	0.33	129.8	0.67	14.0	0.15	126.8
4	0.30	76.8	0.32	78.4	0.14	183.7
5	0.25	14.7	0.04	82.6	0.15	132.4
6	0.09	27.5	0.09	25.1	0.06	177.1
7	0.30	27.0	0.12	27.8	0.11	159.5
8	0.06	75.6	0.13	11.6	0.07	177.8
9	0.11	113.3	0.16	37.9	0.13	89.7
10	0.26	14.7	0.16	79.2	0.06	199.2
16.18.41						
1	0.24	113.2	0.23	113.0	0.08	271.5
2	0.25	27.9	0.24	29.3	0.04	202.0
3	0.11	48.0	0.12	50.9	0.06	156.3
4	0.26	18.3	0.16	41.4	0.02	245.0
5	0.19	55.1	0.19	55.4	0.01	180.2
6	0.13	77.3	0.13	77.0	0.01	250.1
7	0.10	26.3	0.10	26.8	0.02	190.6
8	0.05	126.9	0.07	30.8	0.03	171.5
9	0.06	164.9	0.09	24.2	0.06	167.3
10	0.20	31.3	0.27	20.9	0.04	184.0
16.18.48						
1	0.37	59.4	0.35	59.6	0.09	181.7
2	0.26	43.4	0.26	45.0	0.04	169.0
3	0.12	63.8	0.13	76.4	0.04	140.8
4	0.32	11.1	0.43	0.7	0.17	57.7
5	0.08	76.8	0.22	9.7	0.13	61.8
6	0.10	72.1	0.21	25.1	0.20	51.9
7	0.73	4.9	0.39	15.9	0.13	57.8
8	0.48	14.2	0.42	16.8	0.04	179.4
9	0.40	44.4	0.39	43.7	0.03	204.6
10	0.21	41.3	0.21	41.3	0.04	175.9
16.18.57						
1	0.90	10.4	0.90	10.4	0.00	186.1
2	0.68	6.0	0.68	6.3	0.02	164.4
3	0.48	6.9	0.46	7.0	0.03	181.5
4	0.63	11.5	0.64	11.6	0.01	151.6

5	0.22	16.6	0.41	10.5	0.01	219.3
6	0.20	15.0	0.31	12.4	0.02	220.2
7	0.31	23.5	0.30	23.9	0.03	253.5
8	0.48	8.9	0.52	1.7	0.01	183.5
9	0.30	21.2	0.29	20.1	0.07	177.2
10	0.32	16.3	0.39	25.6	0.05	124.9
16.19.04						
1	0.90	8.3	0.90	8.3	0.02	181.2
2	0.99	2.7	0.78	1.3	0.00	260.6
3	0.12	35.1	0.11	36.1	0.03	244.6
4	0.06	91.7	0.06	91.1	0.03	182.7
5	0.08	78.0	0.08	79.1	0.01	249.1
6	0.08	77.2	0.08	76.6	0.01	248.6
7	0.08	83.7	0.07	85.7	0.04	163.6
8	0.25	21.6	0.21	23.6	0.05	177.3
9	0.08	78.6	0.07	79.5	0.03	160.4
10	0.13	12.6	0.13	13.6	0.04	168.9
16.19.18						
1	0.79	20.1	0.81	13.5	0.08	112.6
2	0.43	27.7	0.53	20.6	0.10	200.7
3	0.45	11.3	0.28	22.5	0.10	100.8
4	0.14	45.7	0.13	46.4	0.04	195.5
5	0.68	5.4	0.07	106.3	0.03	199.1
6	0.38	7.6	0.38	7.6	0.03	249.9
7	0.46	15.0	0.24	18.8	0.06	183.8
8	0.11	93.9	0.10	97.2	0.04	166.5
9	0.07	81.0	0.07	83.3	0.04	163.9
10	0.08	72.6	0.07	68.0	0.05	173.7
16.19.30						
1	0.67	8.5	0.86	2.1	0.07	181.5
2	0.53	6.9	0.73	2.2	0.03	187.5
3	0.64	8.7	0.64	10.0	0.11	103.9
4	0.57	11.0	0.57	9.8	0.06	132.8
5	0.51	12.0	0.51	14.1	0.08	152.9
6	0.45	9.1	0.45	9.6	0.05	135.0
7	0.26	16.3	0.26	16.5	0.01	210.5
8	0.13	61.7	0.15	36.1	0.07	197.5
9	0.30	25.9	0.46	47.5	0.03	313.6
10	0.30	70.7	0.69	12.3	0.05	262.5
16.19.43						
1	0.83	10.9	0.84	11.1	0.02	195.9
2	0.62	7.9	0.62	7.8	0.02	190.3
3	0.44	15.8	0.46	14.7	0.04	239.6
4	0.17	40.3	0.38	19.8	0.09	170.8
5	0.21	27.0	0.11	69.1	0.04	152.2
6	0.37	20.7	0.20	30.9	0.04	195.3
7	0.16	28.4	0.16	28.4	0.02	238.3
8	0.15	60.2	0.15	60.3	0.01	244.9
9	0.11	61.5	0.11	59.5	0.04	167.9
10	0.08	78.0	0.08	80.7	0.04	155.8
16.19.50						
1	0.75	12.9	0.74	12.8	0.10	189.3
2	0.11	67.7	0.37	14.1	0.05	171.8
3	0.60	19.6	0.60	19.5	0.02	199.3
4	0.62	18.3	0.62	18.8	0.05	157.5
5	0.23	27.2	0.23	27.2	0.05	165.9
6	0.43	36.2	0.43	38.4	0.05	121.9

7	0.36	20.9	0.36	20.4	0.02	253.8
8	0.29	36.9	0.38	20.9	0.01	232.9
9	0.35	43.7	0.35	43.4	0.02	196.0
10	0.31	54.3	0.31	57.2	0.04	170.5
16.29.46						
1	0.64	34.0	0.66	30.8	0.01	184.2
2	0.06	79.9	0.10	34.6	0.05	184.3
3	0.32	51.6	0.32	51.7	0.03	190.8
4	0.46	33.5	0.46	33.3	0.04	187.4
5	0.16	60.3	0.15	59.8	0.06	195.7
6	0.69	38.4	0.72	31.6	0.02	159.5
7	0.18	61.4	0.18	62.4	0.05	198.2
8	0.38	51.8	0.38	52.8	0.06	190.1
9	0.54	43.1	0.55	43.4	0.03	180.5
10	0.20	52.2	0.20	51.7	0.04	183.6
16.30.33						
1	0.56	43.7	0.56	43.8	0.02	166.8
2	0.16	60.2	0.16	61.2	0.06	198.2
3	0.14	78.4	0.13	53.2	0.04	186.6
4	0.57	37.9	0.57	37.9	0.01	185.2
5	0.07	44.8	0.12	28.5	0.04	189.2
6	0.39	40.1	0.39	40.0	0.03	191.6
7	0.22	31.7	0.18	43.0	0.04	181.7
8	0.10	45.4	0.10	45.8	0.05	189.6
9	0.45	35.8	0.48	30.9	0.04	177.6
10	0.20	12.1	0.16	11.0	0.04	177.2
16.32.41						
1	0.78	29.2	0.78	29.5	0.02	147.9
2	0.35	26.0	0.35	25.9	0.04	244.6
3	0.44	38.7	0.44	38.7	0.03	172.3
4	0.64	23.2	0.64	23.1	0.02	195.9
5	0.10	46.9	0.10	47.1	0.05	256.1
6	0.71	27.8	0.71	27.6	0.02	248.2
7	0.26	26.3	0.26	25.7	0.05	184.0
8	0.23	50.8	0.26	39.4	0.06	186.7
9	0.33	40.9	0.33	40.8	0.06	189.7
10	0.11	19.8	0.23	6.3	0.02	244.3
16.32.48						
1	0.71	26.3	0.72	26.6	0.03	164.8
2	0.26	31.2	0.26	30.8	0.03	189.3
3	0.37	30.6	0.37	30.5	0.02	186.3
4	0.44	28.5	0.44	28.2	0.03	190.7
5	0.05	54.2	0.05	55.9	0.04	190.6
6	0.38	29.1	0.37	28.5	0.06	188.0
7	0.08	109.0	0.59	3.3	0.07	186.8
8	0.06	117.9	0.12	17.5	0.05	184.5
9	0.37	12.8	0.26	13.0	0.03	223.8
10	0.06	83.2	0.06	85.7	0.05	202.4
16.34.47						
1	0.38	43.3	0.38	43.7	0.03	181.0
2	0.53	33.3	0.53	33.5	0.05	170.9
3	0.38	35.9	0.38	35.8	0.05	175.2
4	0.55	30.7	0.55	30.9	0.03	165.3
5	0.58	25.3	0.58	25.3	0.04	170.7
6	0.44	28.9	0.44	28.7	0.05	186.3
7	0.67	22.0	0.67	22.0	0.04	169.0
8	0.46	25.6	0.46	25.4	0.05	185.7

9	0.71	22.0	0.71	22.3	0.03	157.6
10	0.71	20.7	0.73	16.1	0.02	277.2
16.34.54						
1	0.58	31.6	0.58	31.9	0.04	168.7
2	0.67	23.4	0.68	23.4	0.02	173.0
3	0.33	31.5	0.32	31.2	0.04	185.3
4	0.77	23.7	0.78	23.6	0.03	190.3
5	0.39	28.4	0.39	28.0	0.03	191.1
6	0.60	25.5	0.60	25.3	0.03	188.1
7	0.62	27.7	0.62	27.6	0.04	187.0
8	0.23	39.9	0.23	39.6	0.08	190.5
9	0.53	32.0	0.53	32.0	0.05	182.9
10	0.19	36.9	0.19	36.0	0.07	189.2
16.36.21						
1	0.36	30.4	0.35	30.3	0.02	184.2
2	0.08	67.6	0.07	67.7	0.05	197.9
3	0.24	33.9	0.24	33.7	0.04	184.3
4	0.09	69.1	0.08	71.4	0.05	203.9
5	0.09	44.8	0.08	45.1	0.04	183.5
6	0.18	40.6	0.18	40.3	0.05	190.6
7	0.07	73.1	0.06	75.2	0.05	197.7
8	0.09	69.9	0.08	72.6	0.06	195.3
9	0.11	37.5	0.11	37.8	0.05	184.8
10	0.06	33.6	0.06	34.6	0.04	183.2
17.15.50						
1	0.22	53.5	0.21	53.6	0.08	195.3
2	0.17	49.1	0.17	48.8	0.06	192.9
3	0.19	54.3	0.18	54.6	0.07	193.4
4	0.19	36.4	0.19	36.0	0.04	188.0
5	0.19	41.3	0.19	40.7	0.05	193.0
6	0.17	45.0	0.17	44.7	0.03	194.0
7	0.11	62.4	0.11	64.0	0.05	193.6
8	0.20	35.0	0.20	34.8	0.05	183.5
9	0.14	46.7	0.14	45.9	0.07	190.9
10	0.12	49.7	0.11	49.8	0.05	190.6
18.14.24						
1	0.82	25.7	0.81	25.7	0.02	234.7
2	0.51	16.6	0.51	16.9	0.02	169.7
3	0.35	24.8	0.35	24.5	0.03	188.6
4	0.76	16.5	0.50	21.0	0.02	357.8
5	0.79	12.3	0.21	23.5	0.02	188.9
6	0.64	13.7	0.82	14.1	0.03	257.6
7	0.89	8.4	0.83	6.6	0.03	250.7
8	0.54	15.3	0.33	17.6	0.04	259.8
9	0.17	17.1	0.16	17.9	0.03	253.0
10	0.07	85.6	0.14	21.0	0.04	251.5

9.7 Flight 14 (LHCP)

	2-Ray Model		3-Ray Model			
time	$\lvert\Gamma\rvert$	τ(ns)	$\lvert\Gamma_1\rvert$	τ_1(ns)	$\lvert\Gamma_2\rvert$	τ_2(ns)
20.37.40						
1	0.84	9.0	0.86	10.1	0.05	94.3
2	0.28	39.4	0.28	37.5	0.03	236.7
3	0.87	3.4	0.52	5.8	0.07	169.7
4	0.99	2.1	0.99	2.2	0.03	230.5
5	0.88	24.0	0.88	23.6	0.02	230.5
6	0.90	6.8	0.28	64.2	0.08	241.7
7	0.66	30.5	0.10	104.4	0.05	267.2
8	0.31	38.1	0.32	38.3	0.04	257.5
9	0.30	22.7	0.30	23.1	0.03	221.8
10	1.00	29.0	0.17	100.3	0.08	217.5
20.37.45						
1	0.38	14.7	0.49	17.3	0.09	81.1
2	0.11	40.9	0.57	3.5	0.03	193.9
3	0.40	6.0	0.83	2.2	0.04	183.6
4	0.11	94.9	0.45	0.0	0.07	148.0
5	0.03	89.6	0.08	20.9	0.03	118.2
6	0.70	10.2	0.70	10.6	0.04	174.8
7	0.47	34.0	0.47	34.2	0.05	257.2
8	0.13	56.4	0.13	57.4	0.06	240.2
9	0.31	19.1	0.74	7.8	0.06	170.2
10	0.22	36.2	0.17	50.4	0.07	158.5
20.37.51						
1	0.41	22.9	0.47	13.7	0.03	160.4
2	0.36	38.3	0.46	28.5	0.05	235.1
3	0.38	32.6	0.52	21.7	0.06	160.5
4	0.71	20.4	0.71	20.4	0.04	224.9
5	0.30	53.2	0.31	40.7	0.07	229.1
6	0.76	14.4	0.74	12.5	0.05	218.4
7	0.25	60.2	0.38	29.1	0.07	143.9
8	0.64	27.9	0.67	19.7	0.07	129.0
9	0.32	24.6	0.22	32.7	0.05	172.3
10	0.12	103.8	0.15	30.8	0.10	127.9
20.37.57						
1	0.15	56.0	0.16	65.8	0.11	188.7
2	0.08	117.0	0.17	28.6	0.04	156.5
3	0.41	30.1	0.70	10.9	0.03	138.2
4	0.26	53.4	0.39	25.9	0.10	134.4
5	0.32	26.3	0.48	15.3	0.01	227.4
6	0.80	14.6	0.78	15.6	0.03	180.2
7	0.38	34.7	0.38	35.6	0.03	174.1
8	0.31	46.8	0.67	9.9	0.02	218.4
9	0.34	40.2	0.41	26.7	0.02	199.0
10	0.21	43.8	0.48	9.6	0.04	178.7
20.38.03						
1	0.56	34.9	0.54	36.8	0.13	100.5
2	0.55	62.1	0.56	51.1	0.19	160.6
3	0.26	44.8	0.34	30.5	0.06	201.9
4	0.67	41.6	0.67	30.7	0.07	119.5
5	0.25	54.2	0.39	35.3	0.04	177.8

6	0.69	32.4	0.78	22.2	0.12	134.9
7	0.57	49.3	0.76	14.8	0.05	186.6
8	0.57	41.3	0.56	41.3	0.09	140.5
9	0.48	38.2	0.62	18.9	0.02	183.8
10	0.54	30.6	0.54	30.4	0.04	187.6
20.38.10						
1	0.10	137.5	0.13	29.4	0.07	150.7
2	0.07	79.5	0.08	44.3	0.06	164.9
3	0.65	20.5	0.34	30.5	0.06	201.9
4	0.39	33.2	0.67	30.7	0.07	119.5
5	0.40	27.2	0.39	35.3	0.04	177.8
6	0.81	22.7	0.78	22.2	0.12	134.9
7	0.43	28.5	0.76	14.8	0.05	186.6
8	0.79	19.8	0.56	41.3	0.09	140.5
9	0.60	36.8	0.62	18.9	0.02	183.8
10	0.48	22.2	0.54	30.4	0.04	187.6
20.38.21						
1	0.87	24.2	0.88	32.2	0.06	106.2
2	0.29	51.0	0.31	52.2	0.10	160.3
3	0.87	21.2	0.85	24.7	0.05	102.6
4	0.44	41.9	0.45	43.3	0.07	175.2
5	0.40	27.2	0.40	27.1	0.03	245.4
6	0.61	13.6	0.38	33.1	0.09	160.6
7	0.49	22.8	0.49	22.4	0.02	260.0
8	0.44	37.5	0.43	38.2	0.04	172.7
9	0.59	21.7	0.67	10.5	0.05	173.5
10	0.39	32.1	0.39	31.5	0.04	164.2
20.38.30						
1	0.88	11.0	0.88	11.1	0.01	146.2
2	0.23	43.9	0.24	43.0	0.03	184.0
3	0.24	49.8	0.24	49.6	0.03	199.9
4	0.43	35.8	0.56	18.3	0.04	157.5
5	0.22	43.4	0.23	42.5	0.04	186.6
6	0.06	86.9	0.05	82.9	0.06	140.5
7	0.58	30.8	0.61	27.8	0.03	178.1
8	0.27	20.3	0.23	27.4	0.04	163.4
9	0.25	19.8	0.26	16.1	0.05	164.0
10	0.13	47.4	0.13	45.5	0.04	186.6
20.38.44						
1	0.98	23.2	0.99	23.5	0.04	174.6
2	0.82	20.7	0.82	20.9	0.04	143.1
3	0.68	23.1	0.68	22.6	0.02	173.1
4	0.60	24.8	0.59	24.4	0.04	168.6
5	0.32	50.8	0.32	51.7	0.04	253.2
6	0.24	32.5	0.26	28.3	0.03	223.7
7	0.12	37.1	0.12	42.2	0.04	231.8
8	0.06	174.0	0.25	7.6	0.04	161.5
9	0.36	42.7	0.34	45.5	0.07	183.8
10	0.08	166.0	0.40	11.1	0.07	140.3
20.38.52						
1	0.97	29.2	0.90	27.8	0.08	125.1
2	0.73	29.6	0.75	17.9	0.08	165.4
3	0.80	35.8	0.83	21.2	0.08	202.3
4	0.65	37.3	0.72	22.1	0.01	236.2
5	0.34	44.3	0.44	38.1	0.05	240.1
6	0.52	19.6	0.42	24.7	0.04	225.1
7	0.33	25.1	0.32	26.3	0.02	282.5

8	0.28	41.7	0.31	32.4	0.10	196.8
9	0.24	35.8	0.37	15.7	0.02	239.8
10	0.29	30.3	0.34	23.7	0.06	201.7
20.39.23						
1	0.94	16.9	0.97	13.0	0.05	172.3
2	0.69	18.0	0.59	26.5	0.07	83.1
3	0.61	19.7	0.67	15.2	0.03	141.2
4	0.70	15.8	0.63	17.4	0.04	143.2
5	0.44	29.9	0.93	11.6	0.03	169.9
6	0.44	13.5	0.66	12.2	0.10	151.3
7	0.27	19.3	0.64	12.5	0.07	159.5
8	0.14	50.8	0.19	36.0	0.07	166.7
9	0.09	147.1	0.08	37.5	0.07	144.5
10	0.07	152.2	0.08	32.3	0.06	157.8
20.39.29						
1	0.35	17.7	0.29	22.1	0.06	163.3
2	0.16	30.3	0.37	19.9	0.06	170.6
3	0.14	77.2	0.18	34.1	0.08	166.7
4	0.30	7.4	0.26	8.5	0.03	165.2
5	0.14	27.6	0.13	30.3	0.03	166.5
6	0.11	38.6	0.10	38.3	0.05	153.9
7	0.08	26.8	0.07	29.7	0.02	160.1
8	0.04	81.8	0.04	57.1	0.05	161.4
9	0.21	22.4	0.30	21.0	0.04	176.8
10	0.18	36.2	0.27	32.0	0.05	183.2
20.40.06						
1	0.95	33.7	0.89	32.5	0.08	148.6
2	0.53	48.3	0.52	53.9	0.04	200.0
3	0.54	46.9	0.57	37.6	0.02	272.0
4	0.46	40.3	0.46	42.1	0.08	175.3
5	0.42	25.2	0.48	21.8	0.08	196.8
6	0.68	33.5	0.76	26.2	0.05	201.2
7	0.67	18.2	0.89	7.5	0.06	161.2
8	0.24	28.1	0.32	19.1	0.03	166.8
9	0.37	21.9	0.49	17.6	0.08	166.3
10	0.29	24.8	0.38	20.4	0.07	171.0
20.40.25						
1	0.97	13.2	0.94	12.6	0.06	73.2
2	0.87	9.4	0.89	7.9	0.01	257.2
3	0.39	22.8	0.43	20.2	0.03	232.4
4	0.14	40.8	0.14	43.2	0.04	225.9
5	0.02	107.5	0.05	18.8	0.03	244.3
6	0.09	120.5	0.08	127.2	0.05	234.5
7	0.06	92.8	0.14	20.6	0.03	166.8
8	0.11	101.0	0.26	18.3	0.03	236.1
9	0.13	41.6	0.38	25.0	0.05	236.0
10	0.05	60.5	0.21	18.3	0.03	205.5
20.47.49						
1	0.54	44.8	0.54	45.2	0.02	172.1
2	0.37	40.7	0.37	41.4	0.04	124.5
3	0.56	35.7	0.55	35.6	0.03	261.6
4	0.26	47.6	0.26	47.7	0.03	248.8
5	0.41	36.5	0.41	36.5	0.02	183.0
6	0.30	47.8	0.30	48.1	0.04	252.4
7	0.33	24.6	0.33	24.1	0.02	188.4
8	0.32	37.4	0.31	40.3	0.05	175.5
9	0.23	26.2	0.21	30.6	0.04	170.0

10	0.35	30.4	0.34	31.0	0.04	182.8
20.55.07						
1	0.27	49.5	0.14	42.4	0.04	261.3
2	0.21	65.1	0.28	39.3	0.07	192.7
3	0.23	58.4	0.34	34.7	0.06	194.2
4	0.21	64.3	0.30	37.2	0.05	188.8
5	0.16	60.9	0.15	61.6	0.07	194.6
6	0.27	38.3	0.27	37.8	0.06	189.9
7	0.56	27.0	0.56	26.8	0.04	183.2
8	0.41	33.0	0.40	32.6	0.07	183.2
9	0.17	52.4	0.16	52.7	0.07	189.6
10	0.14	42.4	0.10	59.9	0.06	193.0
20.55.13						
1	0.22	40.8	0.22	39.7	0.07	203.0
2	0.23	41.4	0.22	40.0	0.10	198.6
3	0.28	41.2	0.27	40.7	0.04	196.0
4	0.28	41.3	0.27	40.5	0.08	194.9
5	0.15	60.1	0.14	60.7	0.07	190.6
6	0.15	57.1	0.13	57.7	0.11	195.1
7	0.17	62.0	0.16	63.5	0.10	198.8
8	0.25	42.1	0.24	41.6	0.10	259.5
9	0.32	35.7	0.31	35.4	0.05	187.8
10	0.36	33.2	0.35	32.4	0.08	189.3
20.55.18						
1	0.48	36.0	0.54	28.4	0.06	183.9
2	0.52	32.1	0.58	25.7	0.05	197.7
3	0.48	37.8	0.54	30.1	0.03	186.6
4	0.58	32.6	0.63	26.5	0.04	181.9
5	0.53	32.0	0.58	25.6	0.06	193.9
6	0.56	30.8	0.61	25.1	0.06	251.1
7	0.59	31.0	0.64	25.3	0.03	191.1
8	0.49	34.7	0.48	34.1	0.07	208.0
9	0.46	34.5	0.60	38.0	0.27	79.0
10	0.49	33.0	0.49	32.5	0.05	197.6
20.55.24						
1	0.31	58.9	0.29	59.3	0.10	202.8
2	0.36	55.7	0.34	55.5	0.08	203.1
3	0.39	49.0	0.37	48.5	0.09	199.8
4	0.50	43.0	0.49	42.7	0.07	198.4
5	0.42	50.2	0.41	50.0	0.08	196.4
6	0.31	52.6	0.30	52.3	0.11	201.2
7	0.42	47.5	0.48	36.9	0.05	196.3
8	0.40	50.8	0.45	38.8	0.05	192.7
9	0.53	39.3	0.58	31.5	0.04	193.9
10	0.45	47.0	0.50	36.8	0.05	195.2
20.55.29						
1	0.37	55.9	0.36	55.6	0.08	201.5
2	0.30	70.4	0.28	72.0	0.12	206.0
3	0.49	34.0	0.35	55.8	0.07	203.6
4	0.55	31.8	0.41	50.1	0.06	203.2
5	0.60	29.6	0.47	44.9	0.06	198.5
6	0.52	32.3	0.37	51.7	0.09	199.9
7	0.26	63.7	0.26	57.0	0.09	203.7
8	0.48	39.5	0.50	34.7	0.07	189.5
9	0.26	66.1	0.25	59.5	0.08	201.6
10	0.49	38.2	0.51	33.7	0.06	192.2
21.19.43						

1	0.72	6.6	0.71	6.4	0.04	200.3
2	0.66	10.3	0.66	9.8	0.04	134.7
3	0.56	24.9	0.55	24.5	0.05	202.0
4	0.33	10.5	0.35	9.1	0.09	182.0
5	0.31	21.9	0.31	21.8	0.03	177.8
6	0.22	54.1	0.22	54.7	0.06	209.9
7	0.43	16.6	0.45	15.1	0.05	164.6
8	0.94	3.5	0.94	3.6	0.02	253.4
9	0.76	6.6	0.85	6.0	0.03	235.0
10	0.67	6.8	0.68	6.5	0.03	176.4
21.19.49						
1	0.20	40.2	0.19	40.6	0.08	184.0
2	0.45	24.6	0.62	29.1	0.20	101.9
3	0.59	23.5	0.71	14.7	0.04	189.8
4	0.66	23.8	0.80	16.7	0.10	128.1
5	0.34	25.3	0.34	24.7	0.05	200.8
6	0.16	47.9	0.16	47.0	0.05	188.1
7	0.07	185.0	0.08	5.0	0.07	185.3
8	0.19	51.2	0.19	54.1	0.09	191.8
9	0.23	30.1	0.19	38.1	0.06	182.7
10	0.37	20.8	0.32	24.6	0.07	180.0
21.23.39						
1	0.84	40.7	0.88	26.9	0.01	232.3
2	0.40	45.7	0.43	39.7	0.03	171.3
3	0.66	41.2	0.67	41.2	0.02	180.3
4	0.55	42.9	0.56	43.3	0.03	180.2
5	0.40	43.1	0.40	44.5	0.05	180.4
6	0.72	39.5	0.74	40.9	0.05	168.7
7	0.42	34.7	0.44	31.3	0.03	171.6
8	0.61	35.1	0.63	31.5	0.01	255.1
9	0.56	36.1	0.58	30.7	0.04	164.0
10	0.44	30.6	0.43	31.1	0.03	180.4
21.29.07						
1	0.05	66.8	0.10	34.2	0.05	172.3
2	0.04	192.2	0.14	23.9	0.04	173.8
3	0.05	183.5	0.04	60.1	0.05	178.1
4	0.05	190.2	0.08	36.0	0.05	177.6
5	0.05	185.8	0.05	43.4	0.05	175.1
6	0.05	183.9	0.07	51.6	0.05	178.3
7	0.05	182.6	0.08	31.6	0.05	172.4
8	0.05	186.9	0.07	46.1	0.04	181.6
9	0.06	182.4	0.11	27.7	0.04	173.4
10	0.06	175.2	0.10	23.3	0.05	166.7
21.29.41						
1	0.57	11.1	0.76	7.9	0.04	172.7
2	0.47	14.0	0.50	12.4	0.05	172.1
3	0.72	11.6	0.40	11.0	0.05	171.6
4	0.33	17.5	0.34	15.9	0.05	177.1
5	0.61	15.1	0.21	22.0	0.04	171.6
6	0.51	12.1	0.26	13.9	0.04	171.9
7	0.18	24.3	0.16	26.4	0.04	168.7
8	0.63	15.9	0.34	16.8	0.05	170.0
9	0.37	14.5	0.44	11.1	0.05	170.5
10	0.63	15.0	0.33	16.6	0.04	172.9
21.29.55						
1	0.10	22.1	0.08	96.9	0.05	205.2
2	0.07	32.0	0.07	33.0	0.03	256.7

3	0.36	14.0	0.10	96.2	0.06	209.3
4	0.10	24.9	0.10	21.6	0.05	168.8
5	0.27	16.8	0.07	96.8	0.04	207.8
6	0.30	14.0	0.09	96.4	0.05	208.9
7	0.08	29.5	0.08	25.8	0.04	169.3
8	0.34	15.9	0.10	97.0	0.05	210.2
9	0.09	21.2	0.10	16.3	0.04	169.5
10	0.05	36.8	0.05	97.0	0.04	203.2
21.30.05						
1	0.09	30.8	0.11	23.9	0.04	171.8
2	0.25	18.0	0.28	15.0	0.05	164.0
3	0.29	15.7	0.32	13.6	0.05	172.2
4	0.08	47.9	0.08	39.3	0.04	163.0
5	0.33	16.3	0.37	13.9	0.06	165.8
6	0.10	40.7	0.11	31.9	0.04	169.1
7	0.23	17.9	0.29	13.2	0.05	169.8
8	0.35	16.4	0.39	14.3	0.05	171.2
9	0.19	14.4	0.29	9.4	0.03	250.0
10	0.41	13.3	0.47	11.6	0.05	174.5
21.30.22						
1	0.23	34.2	0.24	30.0	0.04	162.6
2	0.23	31.9	0.45	14.5	0.04	176.4
3	0.35	21.8	0.35	21.9	0.05	162.2
4	0.27	33.9	0.32	23.8	0.04	159.4
5	0.32	32.2	0.35	28.2	0.04	170.2
6	0.38	27.8	0.44	20.8	0.03	169.7
7	0.35	30.6	0.46	21.1	0.04	174.9
8	0.54	15.2	0.57	14.1	0.03	172.3
9	0.49	19.3	0.51	18.6	0.02	249.2
10	0.53	17.2	0.54	16.7	0.02	243.5
21.30.31						
1	0.45	28.6	0.34	54.6	0.08	193.6
2	0.55	35.8	0.57	31.8	0.07	190.6
3	0.48	31.9	0.51	27.9	0.04	179.3
4	0.53	33.7	0.50	38.3	0.05	189.4
5	0.67	23.2	0.66	23.2	0.03	171.9
6	0.54	24.1	0.54	24.1	0.04	178.7
7	0.56	27.0	0.55	27.6	0.04	175.9
8	0.51	29.7	0.51	30.0	0.05	179.8
9	0.55	24.3	0.55	24.6	0.05	175.5
10	0.48	34.8	0.48	34.9	0.05	182.8
21.30.39						
1	0.39	27.9	0.39	27.5	0.05	187.1
2	0.43	32.0	0.43	32.2	0.06	180.1
3	0.39	26.6	0.38	27.2	0.05	178.1
4	0.41	33.5	0.40	33.7	0.05	184.7
5	0.43	26.8	0.43	26.7	0.05	177.7
6	0.39	32.4	0.38	32.2	0.05	185.7
7	0.40	33.7	0.39	33.9	0.05	184.7
8	0.43	28.2	0.42	27.9	0.05	185.4
9	0.40	34.7	0.39	35.2	0.05	183.2
10	0.42	29.3	0.41	29.4	0.07	184.0
21.30.47						
1	0.47	31.6	0.46	31.7	0.06	181.6
2	0.50	24.1	0.50	23.6	0.04	187.2
3	0.45	34.6	0.45	35.0	0.04	182.3
4	0.46	27.8	0.46	27.8	0.05	181.6

5	0.42	31.7	0.42	31.6	0.02	253.1
6	0.38	39.2	0.38	39.4	0.05	189.2
7	0.43	28.3	0.43	27.6	0.04	186.1
8	0.39	39.2	0.38	39.7	0.05	187.3
9	0.42	33.6	0.41	33.7	0.06	182.3
10	0.38	36.2	0.37	35.6	0.05	190.8
21.30.54						
1	0.24	29.3	0.28	20.6	0.05	169.9
2	0.24	25.9	0.28	19.3	0.05	164.2
3	0.23	26.7	0.28	20.0	0.04	165.6
4	0.30	18.3	0.36	13.3	0.04	169.1
5	0.28	21.7	0.25	24.3	0.06	167.3
6	0.27	20.6	0.32	16.2	0.05	165.9
7	0.28	21.3	0.31	16.9	0.05	165.1
8	0.23	23.3	0.23	22.8	0.05	167.3
9	0.28	19.0	0.27	18.6	0.05	164.3
10	0.33	15.7	0.32	15.6	0.05	162.8
21.31.18						
1	0.50	37.6	0.44	47.9	0.06	193.7
2	0.51	34.9	0.51	34.6	0.05	195.4
3	0.60	28.9	0.60	28.7	0.04	193.4
4	0.62	28.5	0.61	28.1	0.05	187.6
5	0.59	30.4	0.62	27.2	0.04	194.6
6	0.57	33.8	0.59	30.4	0.02	188.2
7	0.59	33.4	0.61	30.0	0.05	201.5
8	0.48	34.0	0.44	38.0	0.06	194.1
9	0.30	39.7	0.27	46.0	0.08	198.8
10	0.35	33.1	0.31	38.9	0.06	188.7
21.31.24						
1	0.74	16.5	0.73	16.3	0.03	185.8
2	0.26	39.6	0.38	23.9	0.05	177.8
3	0.19	40.1	0.23	29.6	0.03	257.0
4	0.12	47.5	0.36	15.5	0.04	191.7
5	0.72	16.7	0.81	10.2	0.01	229.1
6	0.47	25.3	0.47	25.0	0.04	186.7
7	0.10	56.6	0.24	24.6	0.04	179.0
8	0.17	31.3	0.17	30.4	0.04	191.4
9	0.50	20.8	0.50	20.4	0.04	188.2
10	0.30	30.7	0.30	30.2	0.05	190.1
21.31.29						
1	0.25	47.8	0.24	47.7	0.08	194.9
2	0.54	26.4	0.53	25.9	0.05	188.1
3	0.54	26.0	0.53	25.6	0.06	183.3
4	0.16	52.9	0.16	52.9	0.07	190.3
5	0.11	37.4	0.10	36.8	0.06	187.2
6	0.13	47.3	0.13	47.4	0.07	192.0
7	0.49	25.5	0.49	25.3	0.05	181.4
8	0.45	23.6	0.45	23.4	0.04	178.2
9	0.22	27.0	0.22	25.7	0.06	191.1
10	0.25	31.2	0.24	30.4	0.07	186.6
21.31.40						
1	0.65	24.9	0.57	33.4	0.04	250.0
2	0.57	26.8	0.46	36.5	0.08	193.4
3	0.48	40.0	0.47	39.6	0.07	192.9
4	0.41	43.6	0.41	43.3	0.04	196.1
5	0.39	42.6	0.38	42.3	0.06	194.4
6	0.33	53.6	0.33	53.9	0.07	197.7

7	0.28	42.9	0.40	26.0	0.05	185.7
8	0.20	50.7	0.22	41.9	0.05	187.8
9	0.22	50.5	0.21	51.1	0.08	194.5
10	0.20	54.6	0.24	38.5	0.04	184.0
21.31.48						
1	0.54	19.2	0.54	19.0	0.02	244.2
2	0.62	20.5	0.62	20.4	0.02	239.5
3	0.65	14.9	0.65	14.9	0.03	186.7
4	0.76	14.8	0.76	14.9	0.03	148.9
5	0.79	13.8	0.79	13.8	0.03	169.5
6	0.66	13.0	0.59	17.0	0.02	214.7
7	0.73	16.4	0.67	21.5	0.04	178.6
8	0.58	15.8	0.58	15.7	0.04	178.5
9	0.44	20.2	0.44	20.0	0.04	180.5
10	0.43	23.9	0.42	24.1	0.05	177.1
21.32.23						
1	0.05	77.6	0.08	19.7	0.05	180.4
2	0.12	38.2	0.16	24.2	0.06	181.9
3	0.14	46.5	0.23	17.2	0.05	168.8
4	0.12	47.7	0.26	22.0	0.05	173.1
5	0.11	34.2	0.16	19.1	0.04	174.2
6	0.13	42.3	0.64	7.5	0.06	172.2
7	0.11	49.2	0.32	14.0	0.05	169.9
8	0.23	20.4	0.18	27.5	0.05	166.4
9	0.20	31.3	0.16	45.3	0.03	175.0
10	0.07	50.9	0.07	48.5	0.05	179.8
21.33.54						
1	0.38	24.1	0.33	27.2	0.05	190.3
2	0.32	31.3	0.27	36.7	0.06	190.0
3	0.30	24.9	0.34	21.3	0.04	178.0
4	0.45	21.5	0.48	19.1	0.02	181.4
5	0.18	43.1	0.22	33.8	0.05	182.2
6	0.36	19.3	0.40	16.1	0.05	187.2
7	0.31	29.9	0.35	25.1	0.05	193.4
8	0.22	26.5	0.41	14.1	0.05	180.5
9	0.39	21.9	0.53	13.6	0.03	202.0
10	0.19	38.5	0.38	19.0	0.04	184.2
21.33.59						
1	0.17	50.0	0.17	49.8	0.07	197.2
2	0.37	30.2	0.36	29.8	0.04	186.2
3	0.22	47.1	0.31	31.8	0.04	185.1
4	0.43	29.9	0.50	23.2	0.05	187.9
5	0.31	38.7	0.43	24.9	0.03	186.1
6	0.30	35.1	0.43	22.5	0.05	189.7
7	0.52	24.6	0.61	17.9	0.03	188.5
8	0.31	36.2	0.44	23.6	0.03	185.7
9	0.44	28.2	0.54	20.0	0.03	183.3
10	0.46	27.3	0.56	19.4	0.04	188.0
21.34.07						
1	0.34	58.5	0.42	39.2	0.04	192.7
2	0.38	42.8	0.42	37.3	0.02	194.2
3	0.45	43.4	0.47	37.9	0.08	192.6
4	0.30	47.6	0.33	40.3	0.08	191.2
5	0.35	51.2	0.37	44.0	0.08	199.2
6	0.34	44.1	0.45	29.2	0.04	187.7
7	0.38	44.8	0.48	30.3	0.04	185.5
8	0.50	37.2	0.45	41.2	0.08	197.0

9	0.49	37.9	0.44	42.0	0.08	197.5
10	0.51	35.0	0.47	38.6	0.07	196.3
21.34.13						
1	0.42	35.4	0.45	30.9	0.05	187.4
2	0.48	31.6	0.48	31.2	0.05	190.9
3	0.50	31.2	0.50	31.0	0.04	188.0
4	0.39	33.7	0.38	33.2	0.06	192.1
5	0.49	33.3	0.49	33.0	0.04	191.2
6	0.55	27.8	0.57	24.8	0.04	193.9
7	0.63	21.1	0.60	22.8	0.04	190.6
8	0.63	20.5	0.59	22.3	0.04	188.5
9	0.62	21.2	0.59	22.9	0.05	187.9
10	0.55	23.4	0.51	25.5	0.05	187.4
21.34.18						
1	0.64	26.2	0.64	26.0	0.02	193.8
2	0.60	26.8	0.60	26.6	0.02	187.1
3	0.63	26.1	0.62	25.8	0.04	194.6
4	0.62	26.8	0.62	26.6	0.02	188.8
5	0.62	25.0	0.61	24.7	0.04	189.0
6	0.63	24.6	0.60	26.8	0.03	188.7
7	0.65	22.3	0.59	26.7	0.04	191.2
8	0.67	21.8	0.62	26.0	0.03	188.6
9	0.64	23.0	0.59	27.6	0.03	190.5
10	0.68	22.6	0.62	26.8	0.04	188.8
21.34.24						
1	0.66	24.9	0.58	32.5	0.06	195.2
2	0.66	24.1	0.58	31.7	0.03	194.5
3	0.67	24.0	0.59	31.6	0.03	193.1
4	0.66	24.9	0.58	33.1	0.06	256.2
5	0.63	25.6	0.54	34.1	0.05	193.8
6	0.66	25.8	0.57	34.2	0.05	191.4
7	0.59	27.1	0.49	36.5	0.08	197.2
8	0.66	24.7	0.58	32.6	0.03	192.3
9	0.63	25.6	0.55	34.3	0.02	192.4
10	0.64	24.9	0.55	33.0	0.04	198.0
21.34.29						
1	0.49	36.0	0.48	35.6	0.05	197.7
2	0.55	36.0	0.54	35.4	0.07	193.8
3	0.53	35.2	0.52	34.7	0.05	190.6
4	0.55	34.4	0.55	34.1	0.04	193.2
5	0.56	35.8	0.55	35.5	0.04	194.7
6	0.53	36.1	0.52	35.6	0.06	194.8
7	0.58	34.5	0.60	30.8	0.05	194.3
8	0.58	35.4	0.63	28.8	0.04	190.6
9	0.54	33.8	0.54	33.4	0.04	199.5
10	0.57	36.5	0.56	36.1	0.05	198.4
21.34.35						
1	0.51	39.3	0.56	31.3	0.06	191.4
2	0.47	41.9	0.52	32.9	0.05	197.6
3	0.47	41.0	0.53	32.6	0.02	190.7
4	0.50	37.8	0.55	30.1	0.03	196.2
5	0.53	37.8	0.58	30.3	0.04	194.7
6	0.52	37.6	0.58	30.4	0.03	195.8
7	0.54	38.0	0.59	30.7	0.03	196.2
8	0.47	38.7	0.53	30.5	0.04	193.2
9	0.45	43.8	0.51	34.3	0.05	195.6
10	0.39	46.3	0.45	35.4	0.07	196.0

21.45.18						
1	0.04	177.6	0.07	13.1	0.04	172.7
2	0.06	173.5	0.06	17.1	0.05	172.3
3	0.05	168.7	0.06	13.3	0.04	171.9
4	0.04	174.7	0.06	15.9	0.02	157.2
5	0.05	171.8	0.04	30.5	0.05	171.0
6	0.05	175.4	0.09	13.3	0.04	170.6
7	0.05	171.3	0.03	33.8	0.02	178.8
8	0.05	166.0	0.05	26.9	0.04	174.8
9	0.05	173.1	0.13	5.3	0.04	168.4
10	0.05	177.0	0.05	21.9	0.02	172.1
22.02.07						
1	0.04	62.5	0.07	43.5	0.04	174.7
2	0.06	187.7	0.05	41.9	0.06	178.2
3	0.08	47.4	0.11	37.3	0.04	177.0
4	0.07	58.9	0.09	40.5	0.05	175.6
5	0.04	135.0	0.14	21.0	0.05	175.9
6	0.08	52.0	0.18	25.6	0.05	165.5
7	0.08	48.9	0.25	20.1	0.03	177.3
8	0.03	145.8	0.12	22.1	0.05	176.3
9	0.04	54.2	0.15	19.9	0.03	173.3
10	0.06	187.8	0.23	13.9	0.04	170.4
22.02.16						
1	0.14	33.8	0.13	34.0	0.06	180.1
2	0.12	41.3	0.11	42.3	0.05	182.0
3	0.16	34.9	0.15	34.8	0.04	182.8
4	0.10	69.0	0.10	70.9	0.05	194.4
5	0.08	44.4	0.08	46.1	0.04	177.9
6	0.04	82.0	0.06	43.7	0.05	172.5
7	0.04	69.0	0.03	73.1	0.04	191.9
8	0.04	52.4	0.04	54.3	0.04	183.2
9	0.07	35.8	0.07	37.6	0.04	174.5
10	0.16	23.9	0.16	25.5	0.03	166.6
22.02.29						
1	0.10	30.2	0.09	30.1	0.04	183.2
2	0.04	61.5	0.04	62.6	0.05	182.9
3	0.10	45.8	0.10	46.1	0.06	184.6
4	0.21	27.2	0.21	27.3	0.03	179.7
5	0.20	23.2	0.20	23.4	0.03	179.2
6	0.18	26.3	0.18	26.2	0.03	182.5
7	0.22	27.7	0.22	27.4	0.03	250.8
8	0.16	32.7	0.16	32.8	0.04	180.8
9	0.15	33.5	0.14	33.2	0.06	183.6
10	0.07	49.2	0.07	49.5	0.04	182.8
22.02.34						
1	0.37	40.7	0.40	35.1	0.05	194.7
2	0.27	47.5	0.30	39.4	0.06	189.7
3	0.28	47.4	0.26	47.0	0.08	192.9
4	0.39	26.8	0.20	52.4	0.06	199.0
5	0.35	26.5	0.17	58.4	0.08	194.9
6	0.38	29.2	0.20	59.0	0.06	200.5
7	0.26	37.7	0.16	58.7	0.08	193.5
8	0.29	35.6	0.29	35.2	0.05	188.0
9	0.23	40.0	0.23	39.4	0.07	190.5
10	0.20	45.9	0.19	45.5	0.06	190.7
22.02.40						
1	0.06	62.8	0.11	39.6	0.04	173.9

2	0.11	34.5	0.16	24.7	0.05	182.4
3	0.10	35.8	0.16	25.8	0.04	180.0
4	0.08	39.5	0.14	26.8	0.05	183.7
5	0.05	53.9	0.10	32.3	0.06	177.0
6	0.09	44.5	0.14	30.4	0.04	175.9
7	0.06	41.4	0.12	24.8	0.03	173.2
8	0.06	34.5	0.12	19.2	0.06	178.2
9	0.05	181.8	0.12	14.3	0.04	184.0
10	0.06	184.2	0.03	52.0	0.06	181.5
22.02.47						
1	0.23	28.2	0.23	28.4	0.04	175.4
2	0.22	27.3	0.22	26.6	0.03	257.9
3	0.19	26.2	0.19	26.4	0.03	176.8
4	0.20	30.8	0.20	31.1	0.05	175.8
5	0.12	55.4	0.12	55.5	0.06	178.4
6	0.12	51.7	0.29	14.5	0.04	184.2
7	0.12	45.7	0.26	18.4	0.04	178.0
8	0.13	24.4	0.20	15.0	0.04	185.3
9	0.08	26.9	0.10	17.7	0.05	168.3
10	0.04	173.2	0.09	9.6	0.04	172.9
22.10.01						
1	0.54	38.8	0.54	39.9	0.06	124.5
2	0.21	61.3	0.23	46.2	0.04	176.6
3	0.42	46.8	0.42	47.1	0.04	189.2
4	0.21	46.8	0.21	46.5	0.02	175.1
5	0.09	72.0	0.16	35.1	0.04	179.8
6	0.13	53.4	0.23	30.2	0.04	167.5
7	0.05	76.3	0.27	0.4	0.05	191.7
8	0.11	58.8	0.19	32.2	0.04	178.4
9	0.09	55.2	0.09	58.0	0.04	179.1
10	0.22	12.5	0.10	27.8	0.05	169.6
22.10.44						
1	0.29	38.1	0.29	38.3	0.03	162.4
2	0.09	61.6	0.09	63.6	0.05	181.5
3	0.33	32.8	0.33	32.8	0.03	183.2
4	0.16	47.5	0.16	48.4	0.05	179.0
5	0.15	55.3	0.15	56.1	0.06	184.7
6	0.40	27.0	0.40	26.7	0.04	188.2
7	0.27	35.8	0.27	36.2	0.04	173.0
8	0.46	27.5	0.46	27.6	0.05	175.5
9	0.39	31.0	0.39	31.0	0.03	181.6
10	0.26	43.7	0.25	44.1	0.06	189.2
22.13.57						
1	0.58	43.4	0.58	43.8	0.04	187.2
2	0.38	50.0	0.38	50.2	0.05	196.8
3	0.76	35.4	0.82	38.3	0.10	89.2
4	0.67	36.3	0.69	38.0	0.06	107.3
5	0.46	35.9	0.38	47.2	0.03	191.6
6	0.85	27.4	0.83	32.2	0.01	186.3
7	0.33	44.8	0.29	59.2	0.07	185.6
8	0.37	41.0	0.34	48.6	0.05	182.3
9	0.24	44.8	0.24	46.6	0.05	175.3
10	0.22	39.8	0.21	42.2	0.05	183.0
22.15.00						
1	0.69	21.4	0.69	21.4	0.02	178.1
2	0.45	25.3	0.45	25.5	0.03	174.7
3	0.35	31.5	0.35	31.7	0.04	176.9

4	0.41	29.6	0.41	29.5	0.02	186.0
5	0.16	42.3	0.16	42.5	0.04	177.1
6	0.54	26.7	0.54	26.8	0.03	168.8
7	0.55	22.6	0.55	22.6	0.03	173.0
8	0.49	25.9	0.49	25.8	0.04	148.6
9	0.67	23.7	0.67	23.7	0.03	154.1
10	0.60	25.4	0.59	25.4	0.03	148.5
22.16.21						
1	0.45	19.4	0.45	19.5	0.03	176.9
2	0.30	17.9	0.20	26.6	0.02	406.0
3	0.12	29.2	0.11	32.3	0.05	177.1
4	0.21	25.3	0.20	26.3	0.04	177.3
5	0.17	23.4	0.21	19.0	0.03	173.3
6	0.31	16.1	0.33	15.3	0.04	187.7
7	0.15	33.1	0.15	32.2	0.06	171.5
8	0.12	41.3	0.11	41.0	0.06	173.7
9	0.17	21.3	0.17	21.2	0.04	168.9
10	0.17	21.7	0.28	10.5	0.06	175.3
22.23.00						
1	0.24	36.9	0.18	35.0	0.07	175.7
2	0.19	50.5	0.35	13.8	0.06	178.8
3	0.31	32.8	0.29	26.9	0.05	185.7
4	0.18	44.8	0.24	20.9	0.07	180.6
5	0.27	39.1	0.38	19.8	0.06	174.7
6	0.56	27.5	0.54	24.3	0.05	177.7
7	0.49	30.6	0.39	35.1	0.07	178.2
8	0.54	30.4	0.45	34.9	0.06	177.7
9	0.30	32.9	0.24	34.2	0.04	174.9
10	0.17	46.9	0.12	62.6	0.07	176.1
22.51.02						
1	0.37	90.2	0.32	90.6	0.09	169.3
2	0.23	135.5	0.16	74.2	0.26	137.7
3	0.15	100.9	0.47	21.4	0.20	93.0
4	0.41	107.0	0.46	14.9	0.27	97.7
5	0.10	159.9	0.29	0.0	0.07	161.4
6	0.15	79.7	0.39	14.7	0.18	66.6
7	0.10	88.5	0.21	22.9	0.10	153.7
8	0.07	92.6	0.21	10.7	0.05	101.6
9	0.33	94.7	0.25	36.2	0.21	106.8
10	0.07	135.0	0.07	106.9	0.02	191.1
22.53.07						
1	0.39	63.1	0.40	63.0	0.11	799.5
2	0.35	61.8	0.62	45.0	0.10	650.1
3	0.23	32.4	0.15	65.7	0.04	677.5
4	0.14	649.2	0.08	136.7	0.13	647.0
5	0.38	20.6	0.17	92.7	0.11	648.4
6	0.16	775.0	0.11	99.1	0.16	775.2
7	0.26	30.3	0.36	138.3	0.14	715.3
8	0.10	78.6	0.13	41.9	0.05	581.3
9	0.28	50.3	0.28	50.7	0.07	585.9
10	0.21	72.0	0.20	66.0	0.07	572.6
22.53.13						
1	0.25	140.0	0.25	142.4	0.08	932.5
2	0.81	37.7	0.82	31.2	0.07	865.2
3	0.29	30.2	0.29	30.2	0.03	947.6
4	0.18	60.7	0.18	60.8	0.02	919.5
5	0.12	53.6	0.12	53.3	0.04	644.5

6	0.09	91.2	0.08	91.1	0.03	796.1
7	0.15	100.1	0.15	98.7	0.08	763.5
8	0.05	137.1	0.07	70.9	0.09	653.0
9	0.39	52.1	0.44	38.9	0.08	847.8
10	0.50	48.3	0.67	17.1	0.03	704.8